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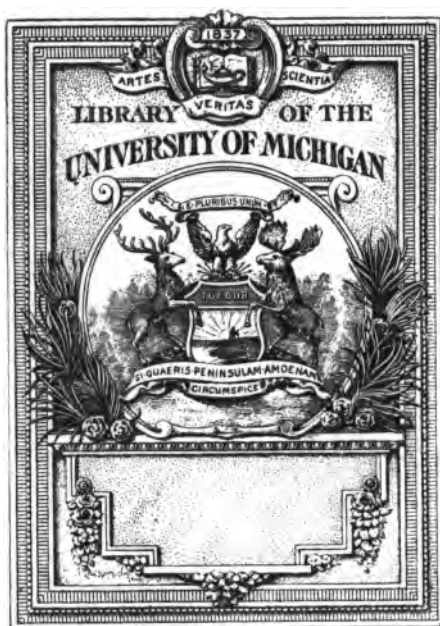
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# NORTHERN POLYPORES

BY

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## PREFACE

Polypores are tough or woody fungi found chiefly on wood in the form of brackets of various shapes and sizes, the fruiting surface being composed of tubes or furrows. Sometimes the walls of these tubes split with age and the hymenium appears spiny, resembling the hydnums; sometimes the furrows change with age to appear like gills. When the fruit-body is perennial, the tubes are often arranged in layers. The family may be divided into four groups, the resupinates, the annual poroid species, the perennial poroid species, and the agaric-like species. The resupinate species cannot be satisfactorily studied without the advantages of a large herbarium and are therefore omitted here, but some of the larger species of the other groups are comparatively easy.

Polypores as a class are very destructive to trees and timber. On the other hand, one species possesses medicinal properties, some of the encrusted species supply tinder, and several of the more juicy ones are excellent for food if collected when young. The only species recognized as poisonous is the medicinal one, *Fomes Laricis*, and it is so tough and bitter that no one would think of eating it.

Polypores are very easily collected and preserved and they largely retain their characters when dried, which makes them excellent objects for class study during the winter months. Many of them, also, remain *in situ* during the winter in perfect condition for collecting. As a group, they lend themselves remarkably well to studies in gross and minute anatomy, variation, adaptation, and injurious effects on trees and structural timbers.

North America may be conveniently divided into five regions: (1) eastern Canada and the northern United States southward to the southern boundaries of Virginia, Kentucky, Missouri, and Kansas, and westward to the western boundaries of Kansas, Nebraska, and the Dakotas; (2) the southern United States,

including North Carolina, South Carolina, Tennessee, Arkansas, Oklahoma, Texas, Louisiana, Mississippi, Alabama, Georgia, and the northern portion of Florida; (3) the Rocky Mountain region, including the remainder of the western United States and Canada with the exception of states bordering on the Pacific Ocean; (4) the far West, including California, Oregon, Washington, British Columbia, and Alaska; and (5) tropical North America, including Mexico, Central America, southern Florida, the Bermudas, the West Indies, and all other islands between North America and South America with the exception of Trinidad.

In all these regions, there is an abundance of work still to be done before our knowledge of the polypores is complete, and it is believed that the publication of a series of books treating the species of each region separately will stimulate effort in this direction.

The terms here used to express the abundance of a species are "rare" or "occasional," "rather frequent," "frequent," "rather common," "common," "very common," and "extremely common." For the sake of brevity, certain liberties have been taken with the term "brown," especially in the keys, where it is often used as a general term for some shade of yellowish-brown or brown. In the same way, allowances must be made for the term "throughout" when used to indicate occurrence, which does not imply the actual presence of a given species on every snowcapped mountain or every treeless prairie within the region.

A few species described in recent years are not here included because they would require citation and discussion beyond our present scope. There is good reason to believe, also, that two or three European species not here listed occur rarely in our region, but an exact statement regarding their occurrence requires additional field work.

W. A. MURRILL.

NEW YORK BOTANICAL GARDEN,  
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## NORTHERN POLYPORES

Including the pileate species occurring in eastern Canada and the northern United States southward to the southern boundaries of Virginia, Kentucky, Missouri, and Kansas, and westward to the western boundaries of Kansas, Nebraska, and the Dakotas.

### POLYPORACEAE

Hymenophore annual or perennial; context fleshy-tough, corky, or woody; hymenium poroid or lamelloid, fleshy to woody, never gelatinous.

Hymenium porose.

Hymenophore annual.

Hymenophore perennial.<sup>1</sup>

Hymenium furrowed.<sup>2</sup>

Tribe 1. POLYPOREAE.

Tribe 2. FOMITEAE.

Tribe 3. DAEDALEAE.

**Tribe 1. POLYPOREAE.** Hymenophore variable in size and shape, fleshy-tough to corky, annual, sometimes reviving; surface encrusted or anoderm, glabrous or hairy, zonate or azonate; context fibrous, rarely punky, variously colored; tubes cylindric, sometimes splitting into teeth, usually thin-walled; spores rounded or oblong, brown or hyaline; cystidia frequently present; surface of pileus never conidia-bearing; stipe often present, variously attached.

Context white.

Hymenophore sessile.

Tubes hexagonal, arranged in radiating rows; context thin.

Tubes mostly shallow, marginal and obsolete; hymenium hydroid or irpiciform at a very early stage.

Tubes normally poroid, sometimes irpiciform from the rupture of the dissepiments at maturity.

Hymenium at length separating smoothly from the context.

Hymenium not separating as above.

Context duplex, spongy above, firm below; surface sodden and bibulous.

#### II. HEXAGONA.

##### 1. IRPICIPORUS.

##### 9. PIPTOPORUS.

##### 6. SPONGIPELLIS.

<sup>1</sup> *Elfvigia lobata* is an exception. *Porodaedalea* is closely allied to the *Daedaleae*. *Cryptoporus* should be in a distinct tribe.

<sup>2</sup> *Cerrena* shows an irpiciform hymenium at maturity, much resembling species of *Coriolus*. *Daedalea* and *Gloeophyllum* sometimes show poroid forms that are very confusing.

## NORTHERN POLYPORES

- Context not duplex as above.
- Pileus fleshy-tough to woody and rigid.
- Hymenium more or less smoke-colored at maturity. 7. BJERKANDERA.
- Hymenium white or pallid.
- Context fleshy to fleshy-tough, friable when dry. 5. TYROMYCES.
- Context punky to corky, not friable when dry. 8. TRAMETES.
- Pileus thin, leathery, and more or less flexible, surface usually zonate.
- Hymenophore preceded by a cup-shaped sterile body. 2. PORONIDULUS.
- Hymenophore not as above.
- Hymenophore normally pileate; tubes small and nearly always regular. 3. CORIOLUS.
- Hymenophore semiresupinate; tubes large and irregular. 4. CORIOLELLUS.
- Hymenophore stipitate.
- Stipe compound. 15. GRIFOLA.
- Stipe simple.
- Plants fleshy, terrestrial. 14. SCUTIGER.
- Plants tough, epixylous.
- Tubes large, hexagonal and radially elongate from the first. 11. HEXAGONA.
- Tubes not as above; except in *Polyporus caudicinus*.
- Pileus inverted, erumpent from lenticels. 10. PORODISCULUS.
- Pileus erect or lateral, not erumpent.
- Context duplex, spongy above, woody below. 13. ABORTIPORUS.
- Context homogeneous, firm. 12. POLYPORUS.
- Context bright-colored, yellow or red; hymenophore sessile.
- Pores red or reddish.
- Tubes unchanged on drying.
- Tubes fragile; surface anoderm. 16. PYCNOPORELLUS.
- Tubes firm and regular; surface pelliculose. 17. PYCNOPORUS.
- Tubes orange-colored, becoming dark and resinous on drying. 18. AURANTIPORUS.
- Pores yellow; plants very large. 19. LAETIPORUS.
- Context brown.
- Hymenophore sessile.
- Spores hyaline.
- Context light-brown.
- Context at first fleshy, becoming slightly corky. 24. ISCHNODERMA.
- Context tough from the first.
- Surface encrusted. 25. ANTRODIA.

- Surface not encrusted.  
 Surface glabrous or nearly so. 23. HAPALOPILUS.  
 Surface distinctly hairy.  
 Tubes small and regular. 21. CORIOLOPSIS.  
 Tubes large and irregular. 22. FUNALIA.  
 Context dark-brown.  
 Context friable. 27. PHAEOLUS.  
 Context tough.  
 Tubes entire. 21. CORIOLOPSIS.  
 Tubes soon splitting into teeth. 20. CERRENELLA.  
 Spores brown. 26. INONOTUS.  
 Hymenophore stipitate.  
 Spores hyaline. 27. PHAEOLUS.  
 Spores brown.  
 Pileus inverted, pendant. 28. COLTRICIELLA.  
 Pileus erect, stipe central. 29. COLTRICIA.
- Tribe 2. FOMITAE.* Hymenophore large, woody, perennial, rarely small or annual; surface anoderm or encrusted, usually sulcate, sometimes varnished; context punky or woody, variously colored; tubes cylindric, usually thick-walled; spores rounded, smooth or verrucose, hyaline or brown; cystidia frequently present; surface of pileus conidia-bearing in a few species; stipe rarely present, the hymenophore usually being sufficiently elevated by its host. Annual forms and species in a few genera connect this group with the Polyporeae; while the tendency at times to produce a daedaleoid hymenium, shown especially in *Porodaedalea*, connects it with the Daedaleae.
- Tubes at first concealed by a volva. 30. CRYPTOPORUS.  
 Tubes free from the first.  
 Surface of hymenophore covered with reddish-brown varnish; context punky to corky. 38. GANODERMA.  
 Surface of hymenophore not as above.  
 Context white, flesh-colored, or wood-colored. 31. FOMES.  
 Context brown or latericeous.  
 Surface not encrusted; or, if so, context woody.  
 Hymenium porose.  
 Spores hyaline. 32. PYROPOLYPORUS.  
 Spores brown. 33. FULVIFOMES.  
 Hymenium porose-daedaleoid. 34. PORODAEDALEA.  
 Surface encrusted; context punky.  
 Hymenophore sessile, cespitose. 35. GLOBIFOMES.  
 Hymenophore sessile, simple or imbricate.  
 Spores hyaline or subhyaline. 36. ELFVINGIELLA.  
 Spores decidedly brown. 37. ELFVINGIA.
- Tribe 3. DAEDALEAE.* Hymenium annual, very rarely perennial, coriaceous to woody, variable in size; surface anoderm, hairy or glabrous, variously marked; context white or brown, fibrous, woody, or punky; hymenium exceedingly variable, normally labyrinthiform or lamelloid, but often poroid or even irpiciform, never stratified; spores smooth, brown or hyaline. Poroid and irpiciform

plants of this group are difficult to separate from certain species of Polyporeae, forms of *Daedalea confragosa* in particular being troublesome to the beginner. On the other hand, there is little to cause confusion between this group and the Fomitaceae, if we except the single distinctly perennial species of *Daedalea* and the daedaleoid forms of *Porodaedalea*.

Context white or wood-colored.

Hymenium labyrinthiform, often becoming lamellate or irpiciform.

Hymenium very soon becoming irpiciform.

Hymenium rarely becoming irpiciform and then not until maturity.

Hymenium lamellate from the first, not becoming irpiciform.

39. CERRENA.

40. DAEDALEA.

41. LENZITES.

Context brown.

Hymenophore sessile, furrows radiate.

Hymenophore centrally stipitate, furrows concentric.

42. GLOEOPHYLLUM.

43. CYCLOPORUS.

## 1. IRPICIPORUS Murrill

Hymenophore annual, epixylous, sessile, effused-reflexed, white or pallid throughout; surface anoderm, glabrous or velvety, not distinctly zonate, margin acute; context white, coriaceous or corky; hymenium hydroid or irpiciform, with traces of shallow, obsolete tubes near the margin; spores smooth, hyaline.

Teeth 1 cm. or more long; pileus usually large and thick.

1. *I. mollis*.

Teeth less than 0.5 cm. long; pileus thin and shortly reflexed.

2. *I. lacteus*.

### 1. IRPICIPORUS MOLLIS (Berk. & Curt.) Murrill

Pileus sessile, dimidiate, imbricate, decurrent, 3-4 × 4-8 × 1-3 cm.; surface white, finely pubescent, azonate, sulcate at times, often aculeate behind with age; context white, coriaceous, 1-5 mm. thick; tubes soon splitting into teeth, which are 1-2 cm. long, compressed to subulate, slender, more or less pointed, dentate or incised, puberulent to glabrous, white to pale-flesh-colored, about 1 mm. apart at the base; spores globose, 5-7  $\mu$ .

Frequent on dead or diseased trunks of deciduous trees throughout, sometimes growing near the tops of trees.

### 2. IRPICIPORUS LACTEUS (Fries) Murrill

Pileus extensively effused, shortly reflexed, imbricate, dimidiate, laterally connate, 0-1.5 × 1-4 × 0.1-0.2 cm.; surface white, subzonate, concentrically furrowed in large specimens, villose; margin very thin, deflexed, undulate to lobed; context membranous, less than 1 mm. thick; tubes short, irregular, white to isabelline, 1-3 mm. long, mouths angular, about 2 to a mm.,

edges uneven, soon splitting into teeth, which are compressed, pointed, fimbriate, dentate to incised; spores cylindric, slightly curved, smooth,  $6-7 \times 2-3 \mu$ .

Extremely common throughout on dead branches and trunks of deciduous trees.

## 2. PORONIDULUS Murrill

Hymenophore annual, tough, sessile, epixylous, at first sterile and cup-like, the fertile portion developing from the sterile; context white, fibrous; tubes short, thin-walled, mouths polygonal; spores ellipsoid, smooth, hyaline.

### 1. PORONIDULUS CONCHIFER (Schw.) Murrill

Pileus thin, coriaceous, dimidiate to flabelliform, usually narrowly attached, conchate, springing from a sterile, cup-like structure, which usually appears on the mature sporophore near the base,  $1.5-2 \times 2-4 \times 0.1-0.2$  cm.; surface white to isabelline, with pale-latericeous zones, finely tomentose to glabrous, the sterile portion avellaneous, with narrow, black, concentric lines; margin thin, concolorous, undulate; context very thin, membranous, less than 1 mm. in thickness; tubes short, about 1 mm. long, thin-walled, white, mouths angular, irregular, 3 to a mm., edges thin, uneven, dentate.

Very common throughout on dead elm branches.

## 3. CORIOLUS Quél.

Hymenophore annual, epixylous, sessile, zonate, anoderm, hairy or glabrous; context thin, white, flexible, fibrous, leathery; tubes thin-walled, white, at length splitting into irpiciform teeth in several species, mouths polygonal or irregular; spores smooth, hyaline.

Tubes more or less entire, at least until the sporophore is quite old.

Surface of pileus wholly or partly glabrous when mature or clothed only with inconspicuous hairs.

Pileus not entirely glabrous at maturity.

Pileus marked at maturity with glabrous zones of a different color from the rest of the surface.

Glabrous zones large, numerous, conspicuously and variously colored.

Glabrous zones small and comparatively inconspicuous.

1. *C. versicolor*.

2. *C. pubescens*.

- Pileus not marked with glabrous zones, but nearly uniform in color and rarely shining; narrowly reflexed.
- Pileus entirely glabrous at maturity.
- Surface brown or blackish, multizonate.
- Surface white to isabelline or pale-fulvous, multizonate, the zones usually pale-latericeous.
- Surface rough, scabrous.
- Surface very smooth and glabrous.
- Surface of pileus clothed entirely with a conspicuous hairy covering.
- Surface roughly hirsute.
- Surface finely hirtose-tomentose.
- Tubes soon breaking up into long, irpiciform teeth.
- Plants large, 5-10 cm. broad.
- Plants much smaller and always very thin.
- Surface ashy-white, villose; plants confined to coniferous wood.
- Surface wood-colored, tomentose; plant found on both deciduous and coniferous wood.
3. *C. subluteus*.
4. *C. planellus*.
5. *C. Lloydii*.
6. *C. concentricus*.
7. *C. nigromarginatus*.
8. *C. subchartaceus*.
9. *C. molliusculus*.
10. *C. abietinus*.
11. *C. prolificans*.

### 1. CORIOLUS VERSICOLOR (L.) QuéL.

Pileus densely imbricate, very thin, dimidiate, conchate,  $2-4 \times 3-7 \times 0.1-0.2$  cm.; surface smooth, velvety, shining, marked with conspicuous, glabrous zones of various colors, mostly latericeous, bay, or black; margin thin, sterile, entire; context thin, membranous; tubes punctiform, less than 1 mm. long, white to isabelline within, mouths circular to angular, regular, even, 4-5 to a mm., edges thick and entire, becoming thin and dentate, white, glistening, at length opaque-isabelline or slightly umbrinous; spores allantoid,  $4-6 \times 1-2 \mu$ .

Extremely common throughout on all forms of dead wood. It also causes a serious root-rot in many trees and is a wound parasite in *Catalpa*.

### 2. CORIOLUS PUBESCENS (Schum.) Murrill

Pileus rather thick, imbricate, laterally connate, dimidiate or flabelliform, conchate,  $3-5 \times 4-8 \times 0.2-0.4$  cm.; surface white, zonate, hirtose-villose to nearly glabrous, finely radiate-lineate in front at times, often radiately-furrowed or slightly plicate; margin at times thin, but usually obtuse, somewhat inflexed; context thin, white, fibrous, 1-2 mm. thick; tubes white, 2-4 mm. long, mouths angular, regular, 2-3 to a mm., edges very thin, entire to denticulate, white to discolored; spores cylindric, subcurved,  $6-8 \times 2-3 \mu$ .

Very common on dead deciduous wood throughout the northern part of the region southward to New York and Ohio.

3. *CORIOLUS SUBLUTEUS* (Ellis & Ev.) Murrill

Pileus broadly effused, narrowly reflexed, thick, white, subimbricate, the reflexed portion  $0.2 \times 2.4 \times 0.5$ – $1$  cm.; surface smooth, tomentose, indistinctly zonate; margin obtuse, undulate; context soft and spongy, white, 3–5 mm. thick; hymenium uneven, subcolliculose; tubes circular to angular or slightly sinuous, 5–10 mm. long, white within, mouths large, 2–3 to a mm., edges thin, white to yellowish, entire to slightly toothed; spores oblong, slightly pointed,  $4\text{--}6 \times 1.5\text{--}2$   $\mu$ .

Found once on dead beech trunks in eastern Canada.

4. *CORIOLUS PLANELLUS* Murrill

Pileus very thin, leathery, somewhat fragile, circular to spatulate or flabelliform, narrowly attached, decurrent at times,  $1\text{--}3 \times 1.5\text{--}2.5 \times 0.05$  cm.; surface finely tomentose when young, becoming glabrous and slightly encrusted, conspicuously multizonate, isabelline to umbrinous with brown or black zones; margin very thin, lobed, often somewhat proliferous; context pallid, membranous; tubes punctiform, white within, often more or less radiately arranged, mouths minute, angular, about 6 to a mm., edges white to slightly yellowish and finally discolored, very thin, easily splitting, denticulate.

Occasional on dead branches of deciduous trees in New England, New York, Iowa, and Missouri.

5. *CORIOLUS LLOYDII* Murrill

Pileus rather thin, laterally connate, rigid, tough, cuneate to flabelliform, applanate, tubercular-sessile,  $2\text{--}3 \times 3\text{--}4 \times 0.2\text{--}0.4$  cm.; surface white to isabelline, scabrous, somewhat rugose, marked with a few narrow, indistinct, pale-latericeous zones; margin thin, fertile, irregular, lobed; context punky-fibrous, white, 1.5–2 mm. thick; tubes 1–1.5 mm. long, white within, mouths angular, subglistening, 4 to a mm., edges thin, firm, dentate, white to isabelline; spores globose, 2  $\mu$ .

Collected once on dead wood at Mammoth Cave, Kentucky.

6. *CORIOLUS CONCENTRICUS* Murrill

Pileus thin, firm, slightly flexible, flabelliform, conchate, depressed behind, attached by a narrow base,  $4 \times 6 \times 0.2\text{--}0.4$

cm.; surface glabrous, indistinctly zonate, subshining, white to pale-isabelline, latericeous behind, the zones tinged with pale-latericeous; margin very thin, lobed, concolorous, glabrous; context white, fibrous, 1 mm. thick; tubes slender, 2-3 mm. long, white within, mouths regular, angular, 3 to a mm., edges thin, firm, denticulate, white to pale-isabelline in dried specimens; spores globose, 3  $\mu$ .

Collected once on dead wood at London, Ontario.

#### 7. CORIOLUS NIGROMARGINATUS (Schw.) Murrill

Pileus confluent-effused, more or less imbricate, dimidiate, appanate, corky-leathery, rather thick, flexible or rigid, 3-5  $\times$  5-8  $\times$  0.3-0.8 cm.; surface conspicuously hirsute, isabelline to cinereous, concentrically furrowed and zoned; margin at length thin, often fuliginous, sterile, finely strigose-tomentose, entire or undulate; context white, thin, fibrous, spongy above, 1-4 mm. thick; tubes white, 1-2 mm. long, mouths circular to angular, 4 to a mm., quite regular, edges thin, firm, tough, entire, white to yellowish or umbrinous; spores cylindric, slightly curved, 2.5-3  $\mu$ .

Extremely common throughout on all forms of dead deciduous wood.

#### 8. CORIOLUS SUBCHARTACEUS Murrill

Pileus rather thick, imbricate, dimidiate, conchate, rigid, tough, 3-5  $\times$  5-8  $\times$  0.5-1.5 cm.; surface nearly smooth, finely hirtose-tomentose, avellaneous, indistinctly multizonate; margin cremeous, villose, thin, sterile, becoming black when bruised; context white, radiate-fibrous, zonate, firm, 2-3 mm. thick; tubes rather long, slender, 3-6 mm., white within, mouths circular to angular, rather irregular with age, 2-3 to a mm., edges at first thick, entire, becoming thin and finally lacerate-dentate, white to avellaneous, glistening; spores ovoid, 5  $\mu$ .

Occasional on dead poplar in Wisconsin, as well as in Colorado and Utah.

#### 9. CORIOLUS MOLLUSCULUS (Berk.) Murrill, comb. nov.

Pileus effused-reflexed, imbricate, laterally connate, the reflexed portion dimidiate, conchate, 2-5  $\times$  5-12  $\times$  0.3-0.7 cm.; surface white, obscurely zonate, nearly smooth, somewhat silky, fibrillose-tomentose; margin acute or obtuse, undulate to lobed; context soft-corky, white, 1-2 mm. thick; tubes 3-5 mm. long, white to discolored within, mouths large and irregular, variable in size, averaging 2 to a mm., edges thin, lacerate-dentate, white

to discolored or light-bay; spores oblong, slightly curved,  $7-9 \times 2.5-3 \mu$ .

Common throughout on dead deciduous wood. *C. biformis* (Kl.) Pat. has been the usually accepted name for this species.

#### 10. CORIOLUS ABIETINUS (Dicks.) Quél.

Pileus effused-reflexed, the reflexed portion thin, tough, flexible to nearly rigid,  $0.5-1.5 \times 1-3 \times 0.05-0.1$  cm.; surface obsoletely zonate, grayish-white, villose; margin thin, undulate to lobed, fimbriate with age, incurved on drying; context very thin, white, membranous; tubes uneven, irregular, soon becoming irpiciform, mouths variable in size, 2-3 to a mm., edges thin, lacerate-dentate, unequal, pallid or violet, fading with age, somewhat flesh-tinted in dried specimens; spores globose,  $4.5-5.5 \mu$ .

Extremely common throughout, especially northward, on decaying coniferous trunks.

#### 11. CORIOLUS PROLIFICANS (Fries) Murrill

Pileus exceedingly variable, sessile or affixed by a short tubercle, dimidiate to flabelliform, broadly or narrowly attached,  $2-5 \times 2-6 \times 0.1-0.3$  cm.; surface finely villose-tomentose, smooth, white or slightly yellowish, marked with a few narrow, indistinct, latericeous or bay zones; margin thin, sterile, entire to lobed; context very thin, white, fibrous; tubes 1-3 mm. long, white to discolored within, mouths angular, somewhat irregular, 3-4 to a mm., usually becoming irpiciform at an early stage, edges acute, dentate, becoming lacerate, white to yellowish or umbrinous.

Extremely common throughout on dead deciduous trees, often covering entire trunks. It is easily mistaken for one of the Hydnaceae.

#### 4. CORIOLELLUS Murrill

Hymenophore small, dry, annual, epixylous, semiresupinate; surface anoderm, usually azonate; context white, thin, fibrous to corky; hymenium concolorous; tubes thin-walled, usually rather large and irregular, dentate, but not irpiciform; spores smooth, hyaline.

Pileus white or pale-isabelline.

1. *C. Sepium*.

Pileus fulvous to latericeous.

2. *C. serialis*.

#### 1. CORIOLELLUS SEPIUM (Berk.) Murrill

Pileus small, dimidiate, laterally connate, narrowly attached when young, becoming decurrent and often effused,  $0.5-1 \times 1-3.5$

× 0.2–0.5 cm.; surface white or pale-wood-colored, finely tomentose to glabrous, subzonate, smooth or broadly radiately furrowed; margin thin or tumid, entire to undulate; context white, 1–2 mm. thick, soft-corky; tubes white, 2–3 mm. long, mouths angular, uneven, irregular, sometimes slightly sinuous, 1–2 to a mm., edges thin, undulate to dentate, white; spores oblong,  $12 \times 5 \mu$ .

Common throughout on structural timber and other dead wood, especially that of deciduous trees.

## 2. CORIOLELLUS SERIALIS (Fries) Murrill

Pileus corky to woody, extensively effused, resupinate or shortly reflexed, seriatly elongate, laterally connate, the reflexed portion very narrow,  $0-1 \times 1-1.5 \times 0.3-0.5$  cm.; surface uneven, subzonate, appressed-tomentose to strigose, hoary-fulvous to latericeous-fulvous; margin thick, pallid, undulate to very uneven; context white, fibrous, membranous, less than 1 mm. thick; tubes slender, white, very variable in size and shape, 2–8 mm. long, mouths circular to angular or irregular, pure-white, becoming pale-yellowish-brown at times on drying, about 3 to a mm., edges rather thick, firm, entire, becoming thinner and dentate; spores oblong,  $6-8 \times 2.5-3 \mu$ .

Rather common throughout on dead coniferous and deciduous wood.

## 5. TYROMYCES P. Karst.

Hymenophore annual, epixylous, sessile, anoderm, azonate, glabrous or nearly so; context white, fibrous, fleshy to fleshy-tough, rigid and friable when dry; tubes thin-walled, white or yellowish, mouths polygonal; spores smooth, hyaline.

Pileus large, 8 cm. or more in diameter.

Tubes less than 5 cm. long.

Surface of pileus marked with rounded depressed spots.

Surface of pileus not guttulate; tubes fragile, lacerate.

Tubes more than 5 cm. long.

Surface sodden, rough, white, becoming blackish, especially at the margin.

Surface tuberculose, ochraceous, not becoming blackish.

Pileus small, rarely exceeding 5 cm. in diameter.

Pileus resinous or cartilaginous in appearance.

Pileus neither resinous nor cartilaginous.

Tubes large, irregular, lacerate, 1–2 to a mm.

1. *T. guttulatus*.

2. *T. obductus*.

3. *T. Spraguei*.

4. *T. tiliophila*.

5. *T. semisupinus*.

6. *T. undosus*.



Tubes much smaller, usually regular and entire.

Surface zonate.

Pileus 1-3 mm. thick, not effused.

7. *T. balsameus*.

Pileus 5 mm. or more thick, effused-reflexed.

8. *T. Ellisionus*.

Surface azonate.

Surface conspicuously villose or tomentose.

Pileus more or less bluish, not effused.

9. *T. caesius*.

Pileus not bluish, effused-reflexed.

10. *T. semipileatus*.

Surface glabrous or nearly so.

Surface pelliculose, more or less tinged with gray.

11. *T. chioneus*.

Surface white, without a pellicle.

Pileus about 2 mm. thick.

12. *T. Bartholomaei*.

Pileus much thicker.

Edges of tubes obtuse, entire.

13. *T. anceps*.

Edges of tubes very thin, lacerate.

14. *T. lacteus*.

### 1. TYROMYCES GUTTULATUS (Peck) Murrill

Pileus cespitose or gregarious, broad, applanate, sessile or attached by an attenuate base, cheesy-soft when fresh, rigid and fragile when dry,  $5-7 \times 10-15 \times 0.5-1.5$  cm.; surface white or yellowish-white, becoming sordid with age, especially at the margin, glabrous, somewhat uneven, slightly zonate at times, marked with numerous rounded, depressed, watery spots, either scattered promiscuously or arranged in zones; margin thin, white to discolored, undulate or lobed; context white, cheesy to fragile, 3-8 mm. thick; tubes white, 3-6 mm. long, mouths small, angular, glistening, 4-5 to a mm., white to avellaneous or umbrinous, often sordid-spotted in dried specimens, edges thin, fragile, lacerate; spores globose,  $5 \mu$ .

Frequent on dead coniferous stumps and trunks from eastern Canada to Michigan and Ohio. Compare *P. alutaceus* Fries.

### 2. TYROMYCES OBDUCTUS (Berk.) Murrill

Pileus thin, fleshy, very fragile when dry, expanding from a wedge-shaped base,  $6 \times 12 \times 0.3$  cm.; surface very smooth, yellowish-brown, glabrous, with a gelatinous-horny pellicle, having the appearance of parchment; margin thin, concolorous, reniform-lobed; context very thin, white, fleshy-tough, becoming fragile and very hard when dry, 1 mm. or less thick; tubes slender, 1.5-2.5 mm. long, white to yellowish within, collapsing, mouths angular, white to yellowish, minute, 6 to a mm., edges very thin, flaccid, lacerate.

Collected once on dead trunks in boreal North America below latitude  $54^\circ$ .

3. *TYROMYCES SPRAGUEI* (Berk. & Curt.) Murrill

Pileus subimbricate, dimidiate or flabelliform, broadly sessile or attenuate behind, convex, fleshy-tough and watery to rigid and fragile when dry,  $4-7 \times 5-10 \times 1-2$  cm.; surface at first milk-white, finely tomentose to glabrous, slightly tuberculose, azonate, sodden, containing depressions filled with exuded water, becoming discolored and roughened and often decaying, especially in damp weather, with a strong and disagreeable odor; margin undulate or slightly lobed, acute, usually discolored, sometimes smoky-black, inflexed when dry; context white, zonate, cheesy when fresh, rigid and somewhat fragile when dry; tubes small, white to yellowish within, 3-8 mm. long, mouths somewhat uneven, angular, 3-4 to a mm., edges white to yellowish, thin, entire; spores ellipsoid,  $6 \times 4 \mu$ .

Common throughout on dead stumps and trunks of chestnut and oak.

4. *TYROMYCES TILIOPHILA* Murrill

Pileus large, convex above, concave below, cheesy when fresh, firm and fragile when dry, attached by an attenuate base, dimidiate to flabelliform,  $8 \times 12 \times 1-1.5$  cm.; surface radiate-rugose, slightly plicate, tubercular, subglabrous, white to ochraceous, marked with pale-latericeous zones; margin thick, fertile, concolorous, undulate; context homogeneous, white, cheesy to fragile, about 1 cm. thick; tubes nearly 1 cm. long, white to slightly yellowish, very fragile when dry, collapsing and wearing away with age, mouths minute, 5 to a mm., subcircular, white to cremeous, slightly discolored with age, edges thin, friable, fimbriate-dentate.

Found once on *Tilia americana* at Ottawa, Canada.

5. *TYROMYCES SEMISUPINUS* (Berk. & Curt.) Murrill

Pileus imbricate-cespitose, thin, rigid when dry, flabelliform, narrowly attached, sometimes with a short process resembling a stipe,  $0.5-1 \times 0.5-0.8 \times 0.05-0.1$  cm.; surface white to flavous, partially dull-latericeous, cartilaginous, glabrous or ornamented with a few abnormal hydroid processes, subzonate; margin very thin, lobed, inflexed when dry; context very thin, white, horny and fragile when dry; tubes short, minute, white, 2-3 mm. long, mouths angular, 4 to a mm., edges thin, dentate.

Occasional in New England, Pennsylvania, and New Jersey on dead trunks of maple, alder, and other deciduous trees.

6. *TYROMYCES UNDOSUS* (Peck) Murrill

Pileus effused, narrowly reflexed, thin, fleshy-fibrous, soft when fresh, rigid when dry, 5-8 cm. broad, 2-3 mm. thick, the reflexed portion 0-7 mm. wide; surface slightly spongy-tomentose, sulcate-zonate, white; margin very thin, undulate, inflexed when dry; context white, very thin, fleshy-fibrous to fragile; tubes 1-3 mm. long, white, mouths large, irregular, angular, 1-2 to a mm., edges very thin, fragile, lacerate, white to slightly yellowish.

Occasional on decaying trunks of hemlock and pine and more rarely on deciduous wood in Maine, New York, and West Virginia.

7. *TYROMYCES BALSAMEUS* (Peck) Murrill

Pileus thin, laterally elongate, fleshy to somewhat fragile, dimidiate, decurrent, cespitose, 1.5-2.5 cm. long, extending laterally 2-10 cm., 2-4 mm. thick; surface radiate-rugose, subglabrous, slightly villose-tomentose behind, whitish or avel-laneous varied with isabelline to fulvous zones; margin undulate or subcrispate, irregular, acute, inflexed when dry; context white, less than 1 mm. thick; hymenium uneven, somewhat cribose; tubes 1.5-2.5 mm. long, white to discolored within, mouths angular, irregular, 3-5 to a mm., edges white to slightly discolored, dentate to sharply lacerate.

Occasional on trunks and stumps of balsam fir and hemlock in Ontario and northern New York. *T. crispellus* (Peck) Murrill is not distinct.

8. *TYROMYCES ELLISIANUS* Murrill

Pileus effused-reflexed, laterally connate, imbricate, fleshy, tough to rigid, the reflexed portion dimidiate or laterally elongate, 1-2 × 2-5 × 0.5-1.5 cm.; surface uneven, pulverulent to glabrous or slightly scabrous, white to isabelline with narrow testaceous zones, sometimes azonate; margin acute or slightly obtuse, inflexed in dried specimens, white, entire or undulate; context rather thick, firm and somewhat fragile when dry, white, about 5 mm. thick; tubes white to pallid or very pale latericeous within, 3-5 mm. long, slender, mouths circular to slightly angular, rather even, 5 to a mm., edges thin, white to isabelline or pale latericeous, entire or slightly dentate; spores globose, 4  $\mu$ .

Collected once on a dead pine trunk at Newfield, New Jersey.

9. *TYROMYCES CAESIUS* (Schr.) Murrill

Pileus dimidiate, imbricate, often narrowly attached, with a prominent umbo, variable in habit and size, soft, spongy when fresh, fragile when dry,  $1-2 \times 3-6 \times 0.5-1.5$  cm.; surface sodden, tomentose or villose-tomentose, azonate, murinous or griseous when fresh, becoming caesious or fading to nearly pure-white on drying, often nearly glabrous with age; context white, soft, friable, 5-8 mm. thick; tubes long and slender, 5-10 mm. long, caesious within, collapsing, friable, mouths angular, 3-4 to a mm., edges white or bluish-gray, very thin, dentate to long and sharply lacerate; spores elongate,  $5-5.5 \times 1.5 \mu$ .

Common throughout on dead wood of both deciduous and coniferous trees.

10. *TYROMYCES SEMIPILEATUS* (Peck) Murrill

Pileus effused, largely resupinate, suborbicular or laterally elongate, very narrowly reflexed, the reflexed portion  $0-1 \times 2-5 \times 0.3-0.5$  cm.; surface white or pale-isabelline, subvillose or scabrous, azonate; margin thin, undulate, sometimes inflexed; context white, fleshy-tough to fragile, 2-4 mm. thick; tubes short, slender, white to yellowish within, mouths minute, circular to slightly angular, scarcely conspicuous, 7 to a mm., edges thin, very even, entire, white to pallid, often bluish-discolored in spots or blotches; spores subglobose, 6-8  $\mu$ .

Common throughout on fallen dead branches of deciduous trees.

11. *TYROMYCES CHIONEUS* (Fries) P. Karst.

Pileus imbricate, sessile, dimidiate, convex,  $2-4 \times 3-6 \times 1$  cm.; surface sodden, grayish-cinereous or yellowish-white, azonate, smooth, pubescent to glabrous, margin acute but rather thick, entire, concolorous, fertile; context sodden and watery when fresh, with a mild flavor and acid odor, white, homogeneous and fragile when dry, cutting with a smooth surface, 7-10 mm. thick; tubes shorter than the thickness of the context, 2-4 mm. long, white to yellowish within, fragile, mouths even, glistening, angular, sinuous at times, 4 to a mm., white to ochraceous, edges thin, fimbriate-dentate; spores cylindric, curved,  $4-5 \times 1-2 \mu$ .

Common throughout on dead branches and trunks of birch and other deciduous trees.

12. *TYROMYCES BARTHOLOMAEI* (Peck) Murrill

Pileus thin, rather soft, obovate, attached by a flattened, stem-like base,  $3 \times 3.5 \times 0.2$  cm.; surface azonate, white,

opaque, finely spongy-tomentose; margin thin, broadly sterile, subentire; context white to pallid, 1-1.5 mm. thick, soft and somewhat spongy, very fragile when dry; tubes decurrent, less than 1 mm. long, white, mouths small, circular, angular, 4-5 to a mm., regular, edges entire to fimbriate-dentate.

Found only at Rockport, Kansas, on decaying sticks and chips.

#### 13. *TYROMYCES ANCEPS* (Peck) Murrill

Pileus effused, resupinate or narrowly reflexed, inseparable from the matrix, firm, sub-corky, slightly flexible, rigid when dry, the reflexed portion 1-2 cm. long, extending laterally for several centimeters by confluence, about 1 cm. thick behind; surface minutely downy, sometimes rugosely pitted, milk-white or slightly discolored, azonate; margin rather thin, acute, concolorous, undulate; context white, fleshy-tough, somewhat fragile when dry, 5-8 mm. thick; tubes 3-5 mm. long, white to pallid within, slender, mouths regular, even, circular, 5-6 to a mm., glistening, white to very pale avellaneous, edges obtuse, entire; spores globose, 5  $\mu$ .

Occasional on dead hemlock and balsam fir in New England and New York.

#### 14. *TYROMYCES LACTEUS* (Fries) Murrill

Pileus dimidiate, sessile, decurrent, convex, very soft, fleshy, becoming rigid when dry,  $2-4 \times 5-8 \times 0.5-1.5$  cm.; surface milk-white, sometimes slightly discolored, azonate, finely tomentose or pubescent to nearly glabrous, more or less silky-striate; margin abruptly thin, inflexed, undulate, concolorous; context spongy-fibrous, very fragile when dry, 5-10 mm. thick, milk-white, zonate at times; tubes quite long, slender, equaling the thickness of the context, 5-10 mm., milk-white within, mouths regular, angular, 4-5 to a mm., glistening, becoming lacerate and somewhat uneven, edges thin, dentate to sharply toothed, fragile, white to slightly yellowish; spores allantoid,  $4-5 \times 1-1.5$   $\mu$ .

Common throughout on dead deciduous and coniferous wood.

#### 6. *SPONGIPELLIS* Pat.

Hymenophore annual, epixylous, sessile, dimidiate, simple or imbricate, rather large; surface white, anoderm, sodden and bibulous; context white, duplex, spongy above, firm below; hymenium concolorous, tubes thin-walled; spores smooth, hyaline.

Pileus more than 1 cm. thick, usually large.

Margin of pileus thick and rounded.

Tubes large, 1 mm. or more across.

Tubes much smaller.

Margin of pileus thin, not rounded.

Surface conspicuously hairy.

Surface nearly glabrous.

Pileus less than 1 cm. thick, small or medium; surface finely tomentose.

1. *S. unicolor*.

2. *S. occidentalis*.

3. *S. borealis*.

4. *S. delectans*.

5. *S. galactinus*.

### 1. SPONGIPELLIS UNICOLOR (Schw.) Murrill

Pileus somewhat imbricate, large and spongy, at length indurate, dimidiate, often unguate,  $5-7 \times 10-15 \times 3-5$  cm.; surface spongy-tomentose, hirtose, azonate, smooth, sordid-white to isabelline or fulvous; margin very thick and rounded, sterile, entire, concolorous; context spongy-fibrous, white, indurate with age, especially below, 1-2 cm. thick; tubes very long, 2-3 cm., white to isabelline within, mouths large, irregular, often sinuous, 1-2 mm. broad, edges thin, fimbriate-dentate to slightly lacerate, white to isabelline, at length bay and resinous in appearance; spores globose,  $6-8 \mu$ .

Rather common on diseased living trunks of oak, maple, and a few other deciduous trees from New Jersey southward and westward to Missouri and Minnesota.

### 2. SPONGIPELLIS OCCIDENTALIS Murrill

Pileus thick, dimidiate, subimbricate, convex above,  $5-8 \times 7-10 \times 2-3$  cm.; surface conspicuously hispid-tomentose, spongy, azonate, smooth or somewhat rugose, white to cremeous or isabelline; margin very thick, rounded, concolorous, fertile; context soft, spongy-fibrous, white to slightly yellowish, 1-2 cm. thick; tubes long and slender, 1 cm. long, white to straw-colored within, fulvous in old dried specimens, mouths minute, angular, 5 to a mm., edges very thin, white to cremeous, fimbriate-dentate, becoming lacerate, collapsing and turning fulvous in old specimens; spores ellipsoid,  $4-5 \times 6-7 \mu$ .

Occasional on beech logs in northern New York.

### 3. SPONGIPELLIS BOREALIS (Fries) Pat.

Pileus subimbricate, dimidiate to flabelliform, often narrowly attached, spongy to corky, very tough, moist and juicy when fresh,  $5-8 \times 8-12 \times 2-4$  cm.; surface uneven, soft and spongy, hirtose-tomentose, azonate, white to yellowish; margin thin, white, entire, somewhat discolored on drying; context fibrous-

coriaceous above, fibrous-woody below, white, 0.5–1.5 cm. thick; tubes 4–8 mm. long, white to pallid within, mouths angular, irregular, somewhat radiately elongate, sinuous at times, 1–2 to a mm., stuffed when young, edges thin, white to ochraceous, dentate to lacerate; spores ovoid,  $5-6 \times 3-4 \mu$ .

Occasional throughout on various coniferous trunks, and more frequent northward, causing serious decay.

#### 4. SPONGIPELLIS DELECTANS (Peck) Murrill

Pileus simple or subimbricate, dimidiate, convex or subtriangular, fleshy-fibrous to corky,  $5 \times 5-10 \times 2-5$  cm.; surface azonate, white to ochraceous-isabelline, uneven, glabrous or slightly floccose-tomentose; margin thin, acute, concolorous, sterile; context soft and spongy above, firm and woody below, white, 1 cm. or more thick; tubes 5–8 mm. long, white within, mouths large, subcircular or angular, somewhat irregular, 1–3 to a mm., edges thin, entire to slightly dentate, white to slightly discolored; spores subglobose to ovoid,  $7-8 \times 5-6 \mu$ .

Frequent on diseased trunks of maple, elm, and certain other deciduous trees in Ohio and Indiana.

#### 5. SPONGIPELLIS GALACTINUS (Berk.) Pat.

Pileus cespitose-imbricate, soft, spongy and watery when fresh, rigid and brittle when dry, dimidiate or reniform, elongate behind, applanate or convex, much contorted on drying,  $3-5 \times 5-10 \times 0.5-1$  cm.; surface hispid or strigose-tomentose, white, azonate, smooth or slightly tuberculose, becoming isabelline on drying; margin thin, but often obtuse, sterile, entire, discolored and inflexed when dry; context zonate, firm, fibrous-woody below, spongy above, 3–7 mm. thick; tubes 3–5 mm. long, slender, white to isabelline, mouths minute, white, glistening, angular or slightly flexuose, 6 to a mm., edges very thin, lacerate-dentate, at length isabelline; spores ellipsoid,  $3-4 \times 1.5-2 \mu$ .

Frequent on dead or diseased trunks of deciduous trees from eastern Canada to Ohio.

#### 7. BJERKANDERA P. Karst.

Hymenophore annual, epixylous, sessile, anoderm, glabrous, azonate, corky; context white, tough or woody, not friable when dry; tubes thin-walled, more or less smoke-colored, mouths polygonal; spores smooth, hyaline.

Hymenium smoke-colored when young, soon becoming black.

1. *B. adusta*.

Hymenium pallid when very young, becoming more or less blackish with age.

2. *B. fumosa*.

### 1. BJERKANDERA ADUSTA (Willd.) P. Karst.

Pileus cespitose-imbricate, decurrent, sometimes effused, conchate, fleshy-tough or corky, somewhat flexible when dry,  $2-4 \times 4-8 \times 0.2-0.4$  cm.; surface undulate, indistinctly zonate, especially near the margin, finely tomentose or villose, isabelline with slightly darker markings; margin thin, undulate, sterile, pallid, usually becoming black as though scorched; context fibrous-corky, white, 1-3.5 mm. thick; tubes short, 1 mm. or less long, smoky-white to blackish within, mouths regular, angular, 5-6 to a mm., smoke-colored and pruinose when young, soon becoming grayish-black, edges thin, entire; spores ellipsoid-allantoid,  $3-5 \times 1.5-2.5 \mu$ .

Extremely common throughout on dead deciduous wood and rarely on that of coniferous trees.

### 2. BJERKANDERA FUMOSA (Pers.) P. Karst.

Pileus cespitose-imbricate, fleshy-corky, firm, dimidiate, conchate, decurrent,  $2-4 \times 5-10 \times 0.5-2$  cm.; surface smooth, finely tomentose, pale-isabelline, subzonate at times; margin thin, concolorous, undulate, easily blackening, usually broadly sterile; context fibrous-corky, somewhat zonate, white to pallid, 5-15 mm. thick; tubes short, 2-3 mm. long, white to discolored within, mouths regular, even, circular, 4-5 to a mm., whitish to smoky-isabelline and finally blackish with extreme age, edges thick, entire; spores globose,  $5-8 \mu$ .

Common throughout on decayed deciduous wood and rarely on coniferous wood. *B. puberula* (Berk. & Curt.) Murrill is not sufficiently distinct.

## 8. TRAMETES Fries

Hymenophore annual, epixylous, sessile; surface anoderm, white, azonate; context white, homogeneous, coriaceous to soft-corky; hymenium concolorous, rigid; tubes thin-walled, mouths circular to irregular; spores smooth, hyaline.

Tubes small, 4 to a mm.; found on *Robinia*.

1. *T. robiniofila*.

Tubes large, 2 to a mm.; found on *Salix*.

2. *T. suaveolens*.

### 1. TRAMETES ROBINIOPHILA Murrill

Pileus more or less imbricate, dimidiate, convex above, plane or concave below, sometimes undulate,  $6-8 \times 10-15 \times 2-4$  cm.;

surface milk-white, azonate, finely pubescent becoming glabrous, uneven, slightly yellowish and discolored with age; margin thick, usually obtuse, concolorous, entire; context white, soft, punky, very juicy when fresh, with a strong fungous odor, usually attacked by insects; tubes slender, 3-5 mm. long, opaque, white to discolored within, mouths minute, circular to very slightly angular, edges thick, entire, becoming rather thin, sordid-white to umbrinous or fuliginous in dried specimens, isabelline when bruised; spores globose to ovoid, 6-8  $\mu$  long.

Common on decayed spots in living trunks of *Robinia Pseud-acacia* from Pennsylvania to Virginia and west to Missouri, doubtless causing decay.

## 2. TRAMETES SUAVEOLENS (L.) Fries

Pileus large, subimbricate, dimidiate, convex above, plane or concave below, 4-6  $\times$  5-12  $\times$  1-3 cm.; surface smooth, azonate, finely villose-tomentose to nearly glabrous, white to pale-isabelline; margin thick, sterile, entire; context white, punky-corky, 1-2 cm. thick, very fragrant when fresh, with the odor of anise; tubes 5-15 mm. long, white within, mouths circular, 2 to a mm., edges at first very thick, white, entire, becoming thinner and often blackish with age; spores oblong-ovoid, sub-sinuate, 8-9  $\times$  3-5  $\mu$ .

Frequent on willow trunks throughout, especially northward, causing serious decay. Easily distinguished at some distance by its agreeable odor.

## 9. PIPTOPORUS P. Karst.

Hymenophore annual, epixylous, umbonate-sessile; surface smooth, azonate, pelliculose; context white, fleshy-tough; hymenium at length separating smoothly from the context; tubes white, thick-walled; spores smooth, cylindric, hyaline.

## 1. PIPTOPORUS SUBEROSUS (L.) Murrill

Pileus fleshy to corky, compressed-ungulate, convex above, plane below, attached by a short umbo behind, varying to bell-shaped when hanging from horizontal trunks, 5-30  $\times$  5-20  $\times$  2-5 cm.; surface smoky, covered with a thin, separating pellicle, glabrous, devoid of markings, cracking with age; margin velvety, concolorous, obtuse, projecting beyond the hymenium nearly a centimeter; context elastic, homogeneous, 3 cm. thick, milk-white; tubes 0.5 cm. long, 2-3 to a mm., sodden-white,

separated from the context by a thin, pink layer, mouths very irregular, dissepiments thicker than the pores, obtuse, entire, crumbling away in age, leaving the smooth, white context; spores cylindric, curved, 4-5  $\mu$  in length.

Common on dead or diseased birch trunks from New Jersey northward and westward to Wisconsin. Sections of large sporophores have been used in Sweden for sharpening razors.

#### 10. PORODISCULUS Murrill

Hymenophore small, annual, tough, epixylous, erumpent from the lenticels of dead branches; stipe attached to the vertex of the pileus, usually curved at maturity; context white, fibrous; tubes cylindric, short, one-layered, mouths constricted; spores globose, smooth, hyaline.

##### 1. PORODISCULUS PENDULUS (Schw.) Murrill

Pileus very small, turbinate-cup-shaped, attached at the vertex, soon decurved and pendant, gregarious, erumpent from the lenticels of dead branches, 1-2 mm. broad, 3-5 mm. long; surface anoderm, azonate, smooth, umbrinous, uniformly covered with a brown powder, often ashy-white with age; margin inflexed, concolorous, sterile; context white, fibrous, very thin; tubes very short, annual, white within, mouths circular, constricted, white, pruinose, becoming concolorous, 6-7 to a mm., edges entire; spores globose, 4  $\mu$ ; stipe 2 mm. or less in length, vertically attached, gradually expanding into the pileus, which it resembles in surface and context.

Frequent on fallen dead twigs of various deciduous trees and occasionally on red cedar from Connecticut southward and westward to Missouri and Iowa. Very common in some localities on dead chestnut branches.

##### 11. HEXAGONA Pollini

Hymenophore small, annual, epixylous, flabelliform to reniform, rarely circular, stipitate, the stipe sometimes much reduced; surface smooth or tessellate; margin thin; context thin, white, fibrous, fleshy to tough, usually fragile when dry; hymenium of radiating rows of large, thin-walled, hexagonal tubes, usually radially elongate; spores smooth, hyaline.

Tubes large; surface of pileus decorated with imbricate, reddish-brown fibrils, which disappear with age.

1. *H. alveolaris*.

Tubes much smaller, the mouths rarely over 1 mm. long and 0.5 mm. broad; surface of pileus glabrous.

2. *H. striatula*.

1. *HEXAGONA ALVEOLARIS* (DC.) Murrill

Pileus reniform to circular, convex-plane, depressed behind,  $3-4 \times 5-7 \times 0.2-0.5$  cm.; surface at first fulvous, strigose-squamose, at length pallid and almost glabrous; margin at first thin, entire, incurved, becoming thicker and undulate or lobed; context white, opaque, 1-2 mm. thick; tubes decurrent, white to pallid, 2-4 mm. long, mouths  $1-1.5 \times 2-3$  mm., edges thin, rigid, dentate; spores ellipsoid,  $10-14 \times 4-4.5 \mu$ ; stipe usually a lateral tubercle, at times eccentric or central, varying in length.

Common throughout on fallen branches and other forms of dead deciduous wood.

2. *HEXAGONA STRIATULA* (Ellis & Ev.) Murrill

Pileus flabelliform to reniform or rarely circular, convex, usually umbilicate or depressed behind,  $2-4 \times 2.5 \times 0.2-0.4$  cm.; surface smooth, glabrous, straw-colored to cream-colored; margin acute, undulate or slightly lobed, rarely reflexed, irregularly denticulate, dark-brown, as if scorched; context white, 1-2 mm. thick; tubes decurrent, ochraceous, 1-2 mm. long, mouths 4-6-angled,  $0.3-0.5 \times 0.6-1$  mm., edges rather firm, beset with small, sharp teeth; spores ellipsoid,  $3 \times 9 \mu$ ; stipe lateral to eccentric, rarely central, slightly enlarged below, concolorous, minutely tomentose to subglabrous, 1-7 mm. long, 3-5 mm. thick.

Frequent throughout on dead trunks and fallen sticks of birch, beech, and certain other deciduous trees. Possibly only a variety of *H. alveolaris*.

12. *POLYPORUS* (Micheli) Paulet

Hymenophore annual, epixylous, small and simple, very rarely large and compound; stipe central, eccentric or lateral, much reduced at times in a few species, often partly or wholly brown or black; surface usually smooth, the margin at times ciliate; context white or yellowish, fibrous, tough to corky; hymenium porose, at times alveolate; spores smooth, hyaline.

Stipe pallid or light-brown, centrally attached, not darker than the pileus.

Margin of pileus devoid of cilia.

Pileus ornamented with conspicuous tufts of fibrils, which are larger and darker toward the center.

Pileus plainly villose, often becoming glabrous with age.

1. *P. fagicola*.

2. *P. Polyporus*.

- Pileus minutely tomentose or glabrous from the first.  
 Pileus large, 10 cm. or more in diameter; surface milk-white. 3. *P. admirabilis*.  
 Pileus of medium size, 2-5 cm. in diameter.  
 Context golden-yellow, not extremely thin; tubes remote from the stipe. 4. *P. phaeoxanthus*.  
 Context whitish.  
 Stipe central. 5. *P. albiceps*.  
 Stipe lateral. 6. *P. humilis*.  
 Margin of pileus ornamented with cilia, which often disappear with age. 7. *P. arcularius*.  
 Stipe wholly or partly black or fuliginous, variously attached, usually darker than the pileus.  
 Pileus squamose, very large, flabelliform; tubes large, alveolar. 8. *P. caudicinus*.  
 Pileus not as above.  
 Pileus 12-25 cm. in diameter, white or pallid. 9. *P. Underwoodii*.  
 Pileus rarely half this size and never white.  
 Surface light-colored, isabelline to pale-ochraceous. 10. *P. elegans*.  
 Surface dark-colored, bright-bay to almost black. 11. *P. fissus*.

### 1. POLYPORUS FAGICOLA Murrill

Pileus circular, convex to plane, umbilicate, 4-5 × 0.1-0.3 cm.; surface smooth, pale-avellaneous, ornamented with tufts of innate fibrils, which are larger and darker near the center and somewhat radially and imbricately arranged; margin very sharp, slightly decurved, regular in outline, not ciliate; context thin, fibrous, white; tubes milk-white, decurrent, favoloid, 1-2 to a mm., edges very thin, fimbriatulate; spores ellipsoid, 3-4 × 6-7 μ; stipe central, solid, thick, nearly equal, concolorous, conspicuously hispid, especially near the base, 2 cm. long, 1 cm. thick.

Collected once on a beech log in Piscataquis County, Maine.

### 2. POLYPORUS POLYPORUS (Retz.) Murrill

Pileus circular, convex to plane, slightly umbilicate at times, 2-8 × 0.2-0.4 cm.; surface fuliginous, more rarely yellowish-brown, hispid-squamulose to minutely hispid; margin at first inflexed, thin, fimbriate, often becoming wavy or lobed; context milk-white, membranous, 1-3 mm. thick; tubes adnate, white to pallid, 1-2 mm. long, mouths circular, regular, 2-3 to a mm., edges at first thick, becoming thin and often dentate with age; spores cylindric, subcurved, 7-8 × 2-3 μ; stipe central, solid, woody, equal, squamulose, avellaneous, not black at the base, 2-3 cm. long, 3-7 mm. thick.

Very common throughout, especially northward, on fallen decayed wood of deciduous trees.

### 3. POLYPORUS ADMIRABILIS Peck

Pilei tufted, more or less imbricate, united near the base, the cluster very large, 30 cm. or more in diameter, centrally depressed or subinfundibuliform, the individual pilei 10–15 cm. broad, 1–3 cm. thick; surface white and finely pseudosquamose when young, sometimes cracking, at length smooth and glabrous and slightly tinged with yellow; margin entire, rather thick, incurved; context fleshy-tough to rigid and friable, homogeneous, white to yellowish-discolored, 1–2.5 cm. thick; tubes slender, 3–7 mm. long, white to yellowish, fulvous with extreme age, mouths nearly circular, 3–4 to a mm., edges thin, dentate; spores globose, somewhat flattened, 5–6  $\mu$ ; stipe short, thick, smooth, glabrous, white, not blackening, often obsolete, 1–2 cm. long, 3 cm. thick.

Occasional on decayed trunks of apple trees in Maine, Massachusetts, and Connecticut.

### 4. POLYPORUS PHAEOXANTHUS Berk. & Mont.

Pileus convex, subhemispheric, 2.5  $\times$  0.5 cm.; surface smooth, glabrous, bay-brown; margin acute, straight, slightly undulate; context fleshy, luteous, rigid, friable and much shrunk when dry, 1–2 mm. thick; tubes remote, minute, very short, 0.5 mm. or less in length, mouths irregular, 6–8 to a mm., edges thick (specimen young), obtuse, luteous; stipe central, cylindric, solid, fleshy, concolorous, floccose at the base, 4 cm. long, 3 mm. thick.

Found once on fallen oak wood at Columbus, Ohio.

### 5. POLYPORUS ALBICEPS Peck

Pileus tough, circular, plane or slightly depressed, 2.5–5 cm. broad, 5–10 mm. thick; surface dry, glabrous, opaque, smooth, white; margin thin, entire, concolorous; context white, 4–8 mm. thick; tubes decurrent, 1 mm. long, white within, mouths scarcely visible to the unaided eye, subcircular, edges thin, white, dentate; stipe central, cylindric, even, 2.5–4 cm. long, 6–8 mm. thick, resembling the pileus in surface and substance.

Found once on buried wood under walnut trees at Sea Beach, New Hampshire.

### 6. POLYPORUS HUMILIS Peck

Pileus spatulate, suborbicular or reniform, 1  $\times$  2–2.5  $\times$  0.1–0.3 cm.; surface white, soft, elastic, subglabrous, azonate; margin

sterile, concolorous, entire, acute, inflexed when dry; context less than 1 mm. thick, spongy, white, somewhat fragile when dry; tubes 1-1.5 mm. long, white, mouths angular, regular, even, 5 to a mm., edges glistening, thin, white to pallid, slightly dentate; stipe lateral, compressed or cylindric,  $2.5-5 \times 0.3-0.6$  cm., resembling the pileus in surface and substance.

Occasional in New York on buried wood in open woods. Also reported from Missouri. Considered by some a synonym of *P. fractipes* Berk. & Curt.

#### 7. POLYPORUS ARCULARIUS (Batsch) Fries

Pileus circular, convex, umbilicate,  $1-2.5 \times 0.1-0.2$  cm.; surface azonate, concentrically rugose when dry, fuscous-squamulose to fulvous and nearly glabrous; margin acute, ciliate-dentate, straight, inflexed on drying; context white, membranous; tubes slightly decurrent, rather firm, white to brownish, 1-2 mm. long, mouths large, oblong-rhomboid, 1-2 to a mm., edges thin, elongate, denticulate; spores cylindric, pointed at the ends, 2-guttulate, copious,  $7-8 \times 1.5-2.5 \mu$ ; stipe central, slender, even, fuscous-gray to fulvous, subsquamulose to glabrous above, hispid-tomentose at the base, 2-4 cm. long, 2-3 mm. thick.

Common throughout from Connecticut southward and westward on dead branches and trunks of various trees. *P. arculariformis* Murrill may be a depauperate form of this species.

#### 8. POLYPORUS CAUDICINUS (Scop.) Murrill

Sporophore of immense size, reaching 50 cm. in breadth and 3 cm. in thickness, usually found in imbricate masses projecting from the trunks of living trees; pileus subcircular and umbilicate when young, soon becoming flabelliform and explanate; surface ochraceous to fulvous, covered with broad, appressed, darker scales, which are very close together in young specimens; margin involute, thin, entire; context fleshy-tough, juicy, milk-white, very thick, odor strong; tubes decurrent, white or pale-yellowish, very short, mouths large, alveolar, 1 mm. or more in diameter, edges thin at maturity, toothed at an early age, becoming lacerate; spores broadly ovoid,  $12 \times 5 \mu$ ; stipe eccentric to lateral, obese, reticulate above, clothed at the base with short, dark-brown or black, velvety tomentum, often reduced, variable in length.

Frequent throughout on decayed trunks of various deciduous trees, appearing in the spring. This fungus is one of the worst

enemies of shade trees in Europe, but it is fortunately too rare as yet in this country to be dangerous.

#### 9. POLYPORUS UNDERWOODII Murrill

Pileus varying from convex to deeply concave, 12-25 cm. in diameter, averaging 0.5 cm. in thickness; surface obscurely concentrically zonate, milk-white, pruinose, cremeous on drying, the center depressed and avellaneous; margin irregularly undulate, lobed, either deflexed or recurved, very thin, not ciliate; context white, fleshy, tough, 2-5 mm. thick; tubes milk-white, 2-3 mm. long, 5-6 to a mm., cylindric, edges thin, entire to lacerate; spores ellipsoid,  $6-7 \times 3 \mu$ ; stipe short, central, solid, woody, equal or tapering downward, smooth, pruinose, white above, fuliginous below, 3 cm. long, 2-3 cm. thick.

Occasional on dead roots of deciduous trees in Massachusetts, Connecticut, and New York.

#### 10. POLYPORUS ELEGANS (Bull.) Fries

Pileus flabelliform to subcircular, scarcely depressed behind, convex or nearly plane,  $2-6 \times 3-10 \times 0.2-1$  cm.; surface distinctly radiate-striate, pruinose when young, becoming glabrous and pale-ochraceous at maturity; margin thin, at first inflexed, often becoming wavy or much lobed and folded with age, not ciliate; context white or pallid, corky, 1-5 mm. thick; tubes pale-avellaneous, 1-3 mm. long, cylindric, mouths angular to subcircular, entire, at first white, glistening, pale-umbrinous with age, 4-5 to a mm., edges thin, entire; spores oblong,  $7-8 \times 3-3.5 \mu$ ; stipe eccentric or lateral, rarely central, woody, smooth, pallid above, abruptly black and scutate below, 1-4 cm. long, 2-5 mm. thick.

Common throughout, especially northward, on fallen branches and trunks of deciduous trees.

#### 11. POLYPORUS FISSUS Berk.

Pileus flabelliform to subcircular, often depressed at the disk or behind, convex, very variable in size,  $5-15 \times 7-20 \times 0.3-1$  cm.; surface glabrous, minutely radiate-striate, bay or fuliginous, rugose on the disk; margin thin, fertile, wavy or lobed, often splitting with age; context corky, pallid, 2-8 mm. thick; tubes white to yellowish-brown, decurrent, 2 mm. long, cylindric, slender, mouths subcircular, very minute, 6-7 to a mm., edges thin, entire, becoming elongate with age; stipe eccentric, varying to central or lateral, usually tapering above, fuliginous to nearly black, pruinose, rugose, 2-6 cm. long, 0.5-2 cm. thick.

Common throughout, especially southward, on fallen dead wood of deciduous trees.

### 13. ABORTIPORUS Murrill

Hymenophore annual, tough, humus-loving; stipe normally central, often obsolete; context yellowish-white, duplex, spongy above, woody below, tubes thin-walled, mouths polygonal; spores smooth, hyaline.

#### 1. ABORTIPORUS DISTORTUS (Schw.) Murrill

Pileus normally thin, plane or depressed, circular and centrally stipitate when properly developed, but often aborted and very irregular, varying to entirely resupinate forms, 6–13 cm. in diameter, 0.3–1 cm. thick; surface conspicuously and compactly tomentose, anoderm, azonate, smooth, white to alutaceous; margin thin, undulate to lobed, concolorous; context soft and spongy above, hard and woody below, white or isabelline, 3–5 mm. thick; tubes annual, decurrent, white, 1–5 mm. long, mouths irregular, variable, 2–3 to a mm., edges thin, entire to dentate; spores subglobose, 5–7  $\mu$  long; stipe central, unequal, very variable, often obsolete, resembling the pileus in surface and context.

Frequent throughout about stumps and buried wood of deciduous trees.

### 14. SCUTIGER Paulet

Hymenophore simple, terrestrial, annual, mesopous, usually bright-colored; surface anoderm, variously decorated; context white, rarely colored, fleshy to tough, rigid and fragile when dry; hymenium porose, white or colored, tubes thin-walled; spores smooth or rarely echinulate, hyaline.

Surface of pileus uneven, squamose or rugose, yellow.

1. *S. Ellisii*.

Surface of pileus smooth, tomentose or glabrous.

Pileus light-colored.

Pileus white.

2. *S. cryptopus*.

Pileus blue when fresh, changing to brown on drying.

3. *S. caeruleoporus*.

Pileus dark-colored, gray or brown.

Stipe black and rooting.

Pileus smoky-brown, subtomentose; tubes regular, entire.

4. *S. radicans*.

Pileus drab-colored, nearly glabrous; tubes irregular, toothed.

5. *S. subradicans*.

Stipe neither black nor rooting.

Pileus gray; stipe short, concolorous.

6. *S. griseus*.

Pileus brown; stipe yellowish-brown, usually eccentric.

7. *S. Whiteae*.

## 1. SCUTIGER ELLISII (Berk.) Murrill

Pileus reniform, convex, cespitose, 12-15 cm. broad, 1-2 cm. thick; surface sulphur-yellow with a greenish tint, very rough, with broad, floccose, imbricate scales; margin thick, concolorous, inflexed; context white or slightly yellowish, fleshy, firm, rather hard when dry, with a strong unpleasant odor when fresh, 1 cm. or more thick; tubes subdecurrent, 3-5 mm. long, mouths large, 1-2 to a mm., irregular, angular, edges thin, white to yellowish, changing to greenish where wounded; spores ovoid, smooth,  $9 \times 6 \mu$ ; stipe lateral or eccentric, slightly flattened, irregularly roughened, solid, subreticulate, dark-yellow, hard and corky within, 7-8 cm. long, 4-5 cm. thick.

Found rarely on clayey soil in low woods in New Jersey, as well as in South Carolina and Alabama.

## 2. SCUTIGER CRYPTOPUS (Ellis &amp; Barth.) Murrill

Pileus circular, convex, 3-7 cm. broad, 3-4 mm. thick; surface glabrous, very smooth, white or slightly grayish; margin very thin, inflexed when dry, concolorous, entire; context white, 1-2 mm. thick; tubes white or yellowish, 1-2 mm. long, slightly decurrent, mouths angular, large, 1-2 to a mm., edges thin, entire or fimbriate; spores ellipsoid, pointed, smooth, hyaline,  $5-7 \times 3-4 \mu$ ; stipe central, bulbous at the base, cylindric, darker than the pileus, 1.5-2 cm. long, 3-7 mm. thick.

Occasional in Kansas and Nebraska, attached to dead grass roots in sandy pastures. Reported also from North Dakota.

## 3. SCUTIGER CAERULEOPORUS (Peck) Murrill

Pilei gregarious or cespitose; pileus broadly convex, circular in outline,  $2.5-5 \times 0.7-1$  cm.; surface subtomentose, hygrophanous when fresh, isabelline to fulvous; context fleshy, fragile, white, becoming yellowish-white when dry; tubes decurrent, short, 3-5 mm. long, grayish-blue when fresh, becoming latericeous within in dried specimens, mouths angular, irregular, 2-3 to a mm., edges thin, uneven, toothed, grayish-blue when fresh, becoming bay in dried specimens; stipe central or eccentric, solid, concolorous or tinged with the color of the pores, 4-5 cm. long, about 5 mm. thick.

Occasional on the ground in woods in New York, New England, and eastern Canada.

## 4. SCUTIGER RADICATUS (Schw.) Murrill

Pileus solitary, fleshy, convex or plane, circular in outline, depressed at the center, 10 cm. broad, 5-9 mm. thick; surface

tomentose, subsquamulose, brown or reddish-brown; margin thin, concolorous, incurved when dry; context soft, spongy, white, homogeneous, 3–6 mm. thick; tubes decurrent, short, white to isabelline, mouths subcircular, 2–3 to a mm., edges thin, white or yellowish, entire; spores ovoid or ellipsoid, smooth,  $12\text{--}16 \times 6\text{--}8 \mu$ ; stipe central, fusiform, cylindric above, expanding into the pileus, elastic, solid, velvety, reticulate, pale-fulvous, black and rooting below.

Frequent throughout most of the region about rotten stumps or trunks. *Polyporus hispidellus* Peck differs in its stiff, erect hairs, lateral or eccentric stipe, and smaller spores. It is occasional northward, extending across the continent from Prince Edward Island to Washington.

#### 5. SCUTIGER SUBRADICATUS Murrill

Pileus irregular in outline, convex to plane,  $12 \times 9 \times 0.5$  cm.; surface fibrillose, drab-colored to isabelline; margin very thin, inflexed when young, irregularly undulate at maturity; context fleshy-tough, 1–7 mm. thick, milk-white even when dry; tubes mere areoles at first, short and small at maturity, scarcely 1 mm. in length, 3–4 to a mm., decurrent to the blackened part of the stipe, white, yellowish when dry, mouths polygonal, regular, at length much elongate by confluence or otherwise irregular, edges thin, toothed or fimbriate when mature; spores ovate to ellipsoid, smooth, hyaline, not abundant,  $5\text{--}7 \times 3\text{--}4 \mu$ ; stipe short, thick, central, tapering and attached at the base, sooty-black up to the pores,  $4 \times 2.5$  cm.; context milk-white, firm, fleshy-tough, surface minutely tomentose, rugose-reticulate when dry.

Found occasionally attached to buried dead wood in Ontario, New York, and Wisconsin.

#### 6. SCUTIGER GRISEUS (Peck) Murrill

Pileus circular, often irregular, convex, 7–12 cm. broad, 1 cm. or less thick; surface glabrous or minutely tomentose, cinereous, slightly darker towards the center; margin thin, concolorous, often incurved on drying, irregular, undulate to lobed; context soft-fleshy, rosy-gray, about 5 mm. thick; tubes slightly decurrent, 1–2 mm. long, whitish-stuffed when young, white to pale-umbrinous within, mouths subangular, unequal, 2–4 to a mm., edges thin, entire to fimbriate, lacerate with age, white when young, becoming gray or umbrinous; spores subglobose, echinulate,  $5\text{--}6 \times 4.5\text{--}5 \mu$ ; stipe central, thick, short, bulbous at the

base, with surface and substance resembling that of the pileus but darker in color, 4-5 cm. long, 1-1.5 cm. thick.

Frequent on the ground in woods in New York, Massachusetts, and southward.

#### 7. SCUTIGER WHITEAE Murrill

Pilei cespitose, often confluent at the base, all stages of development being found in one cluster; pileus subcircular in outline, convex, depressed at the center, 8-12  $\times$  0.5-1 cm.; surface pruinose, velvety to the touch, isabelline to fulvous; margin acute, at first inflexed, irregularly undulate at maturity; context fleshy-tough, 0.2-0.5 cm. thick, of nutty flavor, rose-tinted when dry, dark-red next to the tubes; tubes 0.1-0.3 cm. long, 3 to a mm., very decurrent, white when young and fresh, rose-colored when bruised or dried, mouths circular or subcircular, edges thin, fimbriate; spores ovoid, smooth, copious, 3.5  $\times$  5  $\mu$ ; stipe short, usually eccentric, enlarged at the base, 3  $\times$  2-4 cm., concolorous, tough.

Occasional in damp, shaded places in New England.

#### 15. GRIFOLA (Micheli) S. F. Gray

Hymenophore large, annual, stipitate, compound, intricately branched or lobed, humus-loving or epixylous, rarely terrestrial, usually found at the base of a tree-trunk; surface smooth, pallid to gray or brown; context white, fleshy or fleshy-tough, rigid and fragile when dry; tubes large, irregular, thin-walled, becoming friable or lacinate with age; spores hyaline, smooth or rarely verrucose.

Hymenium ochraceous, becoming dirty-yellow with age; plants terrestrial, irregularly confluent, olivaceous to greenish-yellow.

Hymenium at first fuliginous, becoming paler.

Hymenium white or pallid from the first.

Surface of pileus gray or grayish-brown to coffee-colored; stipe intricately branched; pileoli very numerous and small.

Pileoli lateral, spatulate or dimidiate.

Pileoli centrally attached, circular and umbilicate.

Surface of pileus pallid or alutaceous; stipe not intricately branched, lobes usually few in number and comparatively large.

Sporophore of immense size, 20-60 cm. in diameter; spores echinulate, 8-9  $\mu$ .

Sporophore small for the genus, only 10 cm. or less in diameter; spores smooth, ovoid, much smaller.

1. *G. flavovirens*.

2. *G. Sumstinei*.

3. *G. frondosa*.

4. *G. ramosissima*.

5. *G. Berkeleyi*.

6. *G. Peckiana*.

1. *GRIFOLA FLAVOVIRENS* (Berk. & Rav.) Murrill, comb. nov.

Pileus at first simple and centrally stipitate, becoming imbricate-multiplex when fully developed, 8–20 cm. in diameter; pileoli soft, fleshy, fragile when dry, circular to flabelliform, pulvinate or depressed to applanate, 5–10 cm. broad, 5–8 mm. thick; surface sordid-yellow, with yellowish-green zones, becoming dull-yellowish-green, finely tomentose to subglabrous; margin irregular, undulate to lobed, concolorous; context fleshy, very fragile when dry, 2–4 mm. thick, white to yellowish; tubes very decurrent, yellow to yellowish-green, 3–5 mm. long, mouths irregular, circular to sinuous, 1–2 to a mm., at first milk-white, becoming dirty-yellow, edges thin, fragile, lacerate with age; spores subglobose, smooth, 3–4.5  $\mu$ ; stipe central or eccentric, pallid, 3–6 cm. long, 1–1.5 cm. thick, becoming tubercular and connate-ramose at maturity.

Frequent on the ground in woods throughout the eastern United States westward to Missouri. Very near *P. cristatus* of Europe. *Grifola poripes* (Fries) Murrill is distinct and doubtful.

2. *GRIFOLA SUMSTINEI* Murrill

A very large plant resembling *G. frondosa* in habit and general appearance, but with fewer and broader pileoli, darker surface, and darker hymenium. Pileus imbricate-multiplex, 20  $\times$  30 cm.; pileoli flabelliform to spatulate, 6–8  $\times$  6–8  $\times$  0.3–0.5 cm.; surface radiate-rugose, finely tomentose, light- to dark-brown; margin very thin, fissured and strongly inflexed when dry; context white, fibrous, fleshy-tough to almost leathery, 0.3 cm. thick; tubes 0.2 cm. long, 7 to a mm., at first fuliginous, becoming pallid at maturity, polygonal, irregular, edges very thin and fragile, becoming lacerate; spores globose, smooth, copious, 5  $\mu$ ; stipe tubercular, woody, blackish below, connate-ramose, lighter-colored, passing insensibly into the pileoli above.

Occasional about old stumps and trunks of deciduous trees from New York to Missouri and southward. *P. giganteus* of Europe is very similar in appearance.

3. *GRIFOLA FRONDOSA* (Dicks.) S. F. Gray

Pileus imbricate-multiplex, 15–40 cm. in diameter; pileoli very numerous, branching from a common trunk, imbricate or confluent, variable in size and shape, dimidiate to flabelliform, 1.5–6 cm. broad; surface smoky-gray, fibrillose, radiate-striate; margin thin, undulate or lobed, strongly inflexed when dry; context white, very thin, tough, fragile, having the odor of mice; tubes

white, 2-3 mm. long, mouths circular and regular when young, 3 to a mm., often large and angular with age, edges white, thin, entire to lacerate; spores subglobose to ellipsoid, smooth, hyaline; stipe tubercular, white, connate-ramose.

Common throughout at the base of oak trees, causing serious decay. Edible when young.

#### 4. *GRIFOLA RAMOSISSIMA* (Scop.) Murrill

Pileus imbricate-multiplex, densely clustered, squarrose, umbellate, 12-20 cm. broad; pileoli very numerous, quite regular, circular in outline, depressed at the center, 1-4 cm. in diameter; surface usually fuliginous, sometimes light-brown or even white, fibrillose, very rugose when dry; margin thin, inflexed; context white, fibrous, very thin, fragile when dry; tubes decurrent, shallow, mouths angular, 2-3 to a mm., edges thin, entire to lacerate; spores oblong,  $9-10 \times 3-4 \mu$ ; stipe tubercular, with long cylindric branches, which are white and usually entirely covered with tubes.

Occasional at the base of oak trees throughout most of the region.

#### 5. *GRIFOLA BERKELEYI* (Fries) Murrill

Pileus imbricate-multiplex, 15-50 cm. broad, 10-20 cm. high; pileoli very broad, applanate to infundibuliform, thin, 5-15 cm. broad, 5-15 mm. thick; surface white to obscurely alutaceous, subtomentose, rugose-undulate; margin acute, undulate to lobed, sterile, often inflexed; context white, tough, fragile when dry, homogeneous, milky in young plants, 5-10 mm. thick; tubes decurrent, white, unequal, 2-5 mm. long, mouths angular, about 1 mm. broad, edges soft, white, entire, very fragile when dry; spores globose, roughly echinulate,  $6-8 \mu$ ; stipe short, tubercular, 5-10 cm. thick.

Frequent throughout at the base of oak trees, causing serious decay. In Idaho, this species also attacks the roots of the larch.

#### 6. *GRIFOLA PECKIANA* (Cooke) Murrill, comb. nov.

Pileus fleshy, tenacious, usually somewhat cespitose-multiplex, circular to eccentric or infundibuliform, often depressed, 5-10 cm. broad; surface luteous lightly marked with obscurer lines, glabrous or slightly villose, especially on the disk, margin thin, concolorous, usually undulate or lobed, inflexed when dry; context fleshy, very fragile when dry, white, 1-2 mm. thick; tubes decurrent, white to yellowish, 1-2 mm. long, mouths small, angular, 4-5 to a mm., edges thin, fragile, fimbriate; stipe usually

multiple, central or eccentric, sometimes distorted, equal or slightly attenuate below, paler than the pileus, glabrous, solid, 4 cm. or more long, 5-18 mm. thick.

Occasional in eastern Canada, New York, and Wisconsin, occurring on the ground in woods, usually associated with decaying wood. This species has been confused with *Polyporus fractipes* Berk. & Curt., described from South Carolina.

#### 16. PYCNOPORELLUS Murrill

Hymenophore annual, epixylous, sessile, dimidiate, simple or imbricate, reddish or orange-colored throughout; surface anoderm, margin thin; context thin, friable; tubes thin-walled, fragile, at length lacerate; spores smooth, hyaline or pale-yellowish.

##### 1. PYCNOPORELLUS FIBRILLOSUS (P. Karst.) Murrill

Pileus soft, spongy, fragile when dry, thin, dimidiate, imbricate, 3-5 × 6-8 × 0.5-1 cm.; surface anoderm, orange-colored, fibrillose-tomentose, zonate, at times uneven and sodden in appearance; margin thin, subentire, tomentose, paler; context obscurely zoned, orange-colored, friable when dry, spongy and absorbing water when fresh, 3-5 mm. thick; tubes annual, 3-5 mm. long, pallid to orange-colored, mouths angular, irregular, 1-2 to a mm., edges very thin, pallid and entire when young, at length orange-colored and very lacerate; spores smooth, oblong, hyaline or pale-yellowish, 6-7 × 3-4  $\mu$ .

Occasional on dead coniferous wood in New York and northward, extending around the world. Reported from Massachusetts on maple.

#### 17. PYCNOPORUS P. Karst.

Hymenophore annual, sometimes reviving, epixylous, sessile, dimidiate, simple or imbricate, rarely pseudo-stipitate; surface anoderm, slightly pelliculose at times, zonate or azonate, bright- or dull-red; context red, soft-corky to punky; hymenium concolorous, tubes small, firm, thin-walled; spores smooth, hyaline.

##### 1. PYCNOPORUS CINNABARINUS (Jacq.) P. Karst.

Pileus convex-plane, dimidiate, laterally extended, reviving the second season, 4-6 × 5-10 × 0.5-1 cm.; surface azonate, rugulose, pruinose to tomentose, at length glabrous, the color changing from light-orange to cinnabar-red, often fading with age; margin acute, except in large plants, faintly zonate; context floccose, elastic, zonate, reddish; tubes nearly equaling the

context, firm, minutous within, the mouths small, 2-3 to a mm., regular, coccineous, dissepiments rather thin, entire; spores  $6-8 \times 2-3 \mu$ .

Common throughout on dead wood of various deciduous trees.

#### 18. AURANTIPORUS Murrill

Hymenophore large, annual, epixylous, sessile, dimidiate; surface anoderm, sodden, bibulous, reddish-orange, soon fading; context reddish-yellow, fleshy-tough to woody, juicy when fresh, rigid when dry, conspicuously zonate; tubes small, slender, thin-walled, brilliant-orange when fresh, becoming dark, resinous, and fragile on drying; spores smooth, hyaline.

##### 1. AURANTIPORUS PILOTAE (Schw.) Murrill

Pileus sessile, often subradicate, dimidiate, convex,  $8-20 \times 10-40 \times 1-3$  cm.; surface rugose, sodden, velvety with short hairs, ochraceous or reddish-orange, soon fading, brownish behind; margin ochraceous, sterile, tumid, becoming thinner at maturity; context melleous, tough, watery, elastic, rigid when dry, conspicuously marked with sordid zones, odor strong but not characteristic; tubes 5-10 mm. long, luteous-orange to bright-orange when fresh, becoming dark and resinous on drying, the mouths small, regular, concolorous, 4-5 to a mm., dissepiments thin, minutely fimbriate; spores  $3-4 \times 2-3 \mu$ .

Frequent throughout on much-decayed oak and chestnut logs. Probably not distinct from *P. croceus* Pers. of Europe.

#### 19. LAETIPORUS Murrill

Hymenophore annual, epixylous, fleshy, anoderm, cespitose-multiplex; context cheesy to fragile, light-colored; tubes thin-walled, fragile, bright-yellow, mouths irregularly polygonal; spores smooth, hyaline.

##### 1. LAETIPORUS SPECIOSUS (Batt.) Murrill

Hymenophore cespitose-multiplex, 30-60 cm. broad; pileus cheesy, not becoming rigid, reniform, very broad, more or less stipitate,  $5-15 \times 7-20 \times 0.5-1$  cm.; surface finely tomentose to glabrous, rugose, anoderm, subzonate at times, varying from lemon-yellow to orange, fading out with age; margin thin, fertile, concolorous, subzonate, finely tomentose, undulate, rarely lobed; context cheesy, very fragile when dry, yellow when fresh, usually white in dried specimens, 3-7 mm. thick; tubes annual, 2-3 mm. long, sulphur-yellow within, mouths minute, angular,

somewhat irregular, 3-4 to a mm., edges very thin, lacerate, sulphur-yellow, the color fairly permanent in dried specimens; spores ovoid, smooth or finely papillate,  $6-8 \times 3-5 \mu$ .

Common throughout on living trunks of all our deciduous and evergreen trees, causing a very serious heart-rot. It is one of the best edible fungi.

## 20. CERRENELLA Murrill

Hymenophore thin, effused-reflexed, annual, epixylous; surface brown, zonate, anoderm, margin thin; context thin, coriaceous, brown; hymenium at first poroid, very soon becoming irpiciform, the teeth irregular and compressed; spores smooth, hyaline.

### I. CERRENELLA FARINACEA (Fries) Murrill

Pileus very thin, soft, flexible, coriaceous, entirely resupinate or effused-reflexed, the reflexed portion dimidiate, imbricate, laterally connate,  $0-1 \times 1-5 \times 0.1$  cm.; surface finely concentrically striate, tomentose, umbrinous-chestnut; margin very thin, undulate to lobed, sterile; context membranous, concolorous, papery-thin; tubes short, 1 mm. or less, irregular, 2-3 to a mm., edges thin, fimbriate to lacerate, dentate, separated at a very young stage forming an irpiciform hymenium, yellowish-green to olive and finally cinereous and farinaceous; spores  $6-7 \times 2.5 \mu$ .

Occasional on decaying branches of oak and other hardwood trees in Iowa, Ohio, and southward.

## 21. CORIOLOPSIS Murrill

Hymenophore thin, flexible or rigid, annual, epixylous, sessile, dimidiate, often largely resupinate; surface light-brown to bay-black, zonate, anoderm, rarely encrusted with age, hairy; margin thin; context thin, coriaceous to woody, isabelline to purplish-umbrinous, rarely almost white; hymenium concolorous; tubes small, regular, thin-walled, entire; spores smooth, hyaline.

### I. CORIOLOPSIS RIGIDA (Berk. & Mont.) Murrill

Pileus thin, coriaceous, flexible to rigid, effused-reflexed, imbricate, laterally connate, the reflexed portion flabelliform, applanate or conchate,  $0.5-3 \times 3-6 \times 0.1-0.2$  cm.; surface spuriously zoned, sometimes zonate behind, concentrically furrowed at times, hirsute to hispid, nearly white to isabelline; margin very thin, pallid, undulate to lobed; context pallid to

isabelline, membranous; tubes very short, grayish-isabelline within, mouths fairly regular, circular to slightly angular, 3-4 to a mm., edges white to grayish-white and finally isabelline, rather thick at first, becoming thin, entire and slightly uneven.

Occasional on dead wood from Pennsylvania to southern Michigan and southward.

## 22. FUNALIA Pat.

Hymenophore annual, epixylous, sessile, dimidiate, often semi-resupinate; surface anoderm, hairy to aculeate; context light-brown, more or less duplex, spongy above, coriaceous to woody below; tubes usually large, thin-walled, more or less lacerate; spores smooth, hyaline.

### 1. FUNALIA STUPPEA (Berk.) Murrill

Pileus corky to woody, variable in size, dimidiate, decurrent, imbricate, convex above,  $2-6 \times 5-12 \times 0.5-3$  cm.; surface ferruginous to fulvous, hirsute to villose, azonate, sulcate at times; margin thin or rounded, concolorous, entire or slightly undulate; context isabelline, zonate, corky to woody, duplex in large specimens, being softer above, 0.3-1.5 cm. thick; tubes rather long, 3-12 mm., whitish-isabelline within, mouths rather variable in size, subcircular to angular, distorted with age, averaging about 1 mm. in diameter, edges thin, fimbriate to toothed, isabelline to fuscous; spores oblong or slightly curved,  $11-13 \times 3.5-4 \mu$ .

Frequent throughout on dead poplar trunks and less common on willow and a few other trees. Very similar in some of its forms to *Trametes hispida* Bagl. of Europe.

## 23. HAPALOPILUS P. Karst.

Hymenophore annual, rarely perennial, epixylous, sessile, dimidiate, simple or imbricate; surface anoderm, rarely pelliculose, zonate or azonate, usually brown and glabrous; context brown, leathery or corky, tough or rarely friable when dry; hymenium usually differently colored, tubes small, thin-walled; spores small, usually ovoid, hyaline.

Hymenium concolorous; context soft and friable.

1. *H. rutilans*.

Hymenium differently colored; context rigid or corky, not friable.

2. *H. gilvus*.

### 1. HAPALOPILUS RUTILANS (Pers.) Murrill

Pileus thick, convex above and below, very soft, fleshy, dimidiate, usually broadly attached, more or less imbricate at

times,  $2-4 \times 3.5-7 \times 0.5-1.5$  cm.; surface smooth, anoderm, azonate, finely villose to glabrous, ochraceous-isabelline to bay-brown; margin rather thick, entire or undulate, becoming reddish-brown when bruised; context spongy, friable when dry, ochraceous-isabelline, 3-7 mm. thick; tubes rather long, slender, isabelline to pale-fulvous, 3-6 mm. long, mouths angular, averaging 3 to a mm., somewhat irregular with age, edges isabelline, whitish when young, thin, very fragile, subentire; spores ellipsoid or globose,  $3 \times 2.5 \mu$ .

Frequent on dead deciduous wood, especially hickory, from Canada southward to Virginia and Kansas.

## 2. HAPALOPILUS GILVUS (Schw.) Murrill

Pileus corky, dimidiate, imbricate, applanate or conchate,  $3-6 \times 5-10 \times 0.5-1.5$  cm.; surface finely tomentose to glabrous, azonate, isabelline to fulvous, often marked with indistinct purplish-fuscon bands, rugulose to uneven; margin thin, ferruginous, entire to undulate, abruptly sterile; context ferruginous, fibrous-spongy to corky, zonate, 3-7 mm. thick; tubes short, slender, avellaneous to grayish-umbrinous within, 3-5 mm. long, often found stratified, especially in the tropics, mouths small, regular, circular to angular, 6-8 to a mm., edges at first thick, pale-ferruginous, becoming thin, entire, glistening, olivaceous-fuscon to purplish-fuscon; spores elongate-ellipsoid,  $4-6 \times 2-4 \mu$ ; cystidia chestnut-colored, ovate-subulate,  $15-20 \times 4-5 \mu$ .

Extremely common on dead deciduous wood throughout. Also reported common on red cedar about Washington, D. C.

## 24. ISCHNODERMA P. Karst.

Hymenophore large, annual, epixylous, sessile; surface pelliculose, glabrous; context light-brown, fleshy to slightly corky, friable when dry; tubes small, thin-walled; spores smooth, hyaline.

### 1. ISCHNODERMA FULIGINOSUM (Scop.) Murrill

Pileus very large, subimbricate, laterally connate, effused-reflexed, often covering the entire under surface of logs, the reflexed portion applanate, 5-15 cm. long, 10 to many cm. broad, 1-2.5 cm. thick; surface pelliculose, floccose, rugose, zonate, fuliginous, ivory-black, and dark-fulvous, with a conspicuous resinous appearance; margin acute, concolorous, inflexed on drying, entire or undulate; context fleshy, becoming corky

with age, very firm and rather fragile when dry, light-brown, 5-10 mm. thick; tubes pallid to umbrinous, 5-8 mm. long, mouths minute, white, angular, equal, becoming umbrinous and somewhat irregular with age, edges thin, fimbriate to lacerate; spores cylindric, subcurved,  $4-6 \times 1.5-2 \mu$ .

Frequent throughout on fallen trunks of basswood, maple, fir, spruce, and certain other trees.

## 25. ANTRODIA P. Karst.

Hymenophore small, annual, epixylous, sessile or semi-resupinate; surface zonate, encrusted, glabrous; context thin, light-brown, fibrous; tubes short, firm, thin-walled; spores smooth, hyaline.

### 1. ANTRODIA MOLLIS (Sommerf.) P. Karst.

Pileus sessile or semiresupinate, often broadly effused, the reflexed portion irregular, imbricate, conchate, often plicate, 1-2 cm. long, 2-8 cm. broad, less than 5 mm. thick; surface light-brown to umbrinous or black, encrusted, conspicuously multizonate, finely tomentose to glabrous, uneven; margin acute, rather thick, sterile, pale-brown, finely tomentose; context very thin, membranous, light-brown next to the tubes, fulvous above with a black line between; tubes very variable in size and shape, avellaneous within, 2-4 mm. long, mouths circular to sinuous, 1-3 to a mm., edges rather thick, firm, entire, often splitting into flat teeth in old plants; spores elongate-ellipsoid,  $9-11 \times 4-5 \mu$ .

Frequent throughout on dead deciduous wood.

## 26. INONOTUS P. Karst.

Hymenophore annual, epixylous, sessile, dimidiate, simple or somewhat imbricate, variable in size; surface usually anoderm, brown, hairy or glabrous; context brown, thin and fibrous to spongy or corky; hymenium concolorous, usually covered with whitish powder in youth, tubes small, thin-walled; spores smooth, light- to dark-brown.

Sporophore large, 10-30 cm. or more broad.

Surface conspicuously hirsute.

Surface glabrous or nearly so.

Spores pale-brown.

Spores deep-brown.

Sporophore of medium size, about 5-10 cm. broad.

Spores deep-brown in color; surface tomentose.

Spores faintly tinged with brown; surface glabrous or subglabrous.

1. *I. hirsutus*.

2. *I. dryadeus*.

3. *I. dryophilus*.

4. *I. perplexus*.

5. *I. radiatus*.

1. *INONOTUS HIRSUTUS* (Scop.) Murrill

Pileus thick, compact, fleshy to spongy, dimidiate, sometimes imbricate, compressed-ungulate,  $7-10 \times 10-15 \times 3-5$  cm.; surface hirsute, ferruginous to fulvous, azonate, smooth; margin obtuse, velvety; context spongy-corky, somewhat fragile when dry, ferruginous to fulvous, blackening with age, 1-1.5 cm. thick; tubes slender, about 1 cm. long, ferruginous within, mouths angular, 2-3 to a mm., ferruginous to bay, blackening with age, edges thin, very fragile, lacerate; spores broadly ovoid, smooth, thick-walled, deep-ferruginous, 2-guttulate,  $7-8 \times 5-6 \mu$ .

Occasional throughout on living trunks of oak and certain other deciduous trees. A very abundant and destructive enemy of shade trees in Europe.

2. *INONOTUS DRYADEUS* (Fries) Murrill

Sporophore of immense size, dimidiate, rarely circular, usually imbricate, applanate or depressed above, convex below, fleshy to spongy-corky, rather fragile when dry,  $15-30 \times 25-65 \times 3-5$  cm.; surface very uneven, azonate, opaque, hoary-isabelline, anoderm to very thinly encrusted, subshining and bay; margin thick, pallid, entire to undulate, weeping; context thick, zonate, subglistening, ferruginous-isabelline to fulvous, 2.5-4 cm. thick; tubes grayish-umbrinous to fulvous within, 5-15 mm. long, slender, very fragile, mouths whitish when young, becoming somewhat resinous in appearance and finally bay-brown, at first minute, circular, becoming angular, 4 to a mm., edges thin, fimbriate to lacerate, deeply splitting and separating with age; spores subglobose, smooth,  $8-10 \times 7-8 \mu$ , the outer wall hyaline, the inner membrane brown; cystidia  $15-35 \times 5-9 \mu$ .

Occasional throughout as a root parasite of various species of oak, the large sporophores appearing near the base of the trunk. Attention is called to recent studies of this species and the next by W. H. Long.

3. *INONOTUS DRYOPHILUS* (Berk.) Murrill

Pileus thick, unequal, unguliform, subimbricate, rigid,  $7-8 \times 10-14 \times 2-3$  cm.; surface hoary-flavous to ferruginous-fulvous, becoming scabrous and bay with age; margin thick, usually obtuse, sterile, pallid, entire or undulate; context ferruginous to fulvous, zonate, shining, 3-10 mm. thick; tubes slender, concolorous with the context, about 1 cm. long, mouths regular, angular, 2-3 to a mm., glistening, whitish-isabelline to

dark-fulvous, edges thin, entire to toothed; spores subglobose, smooth, deep-ferruginous,  $6-7\ \mu$ ; cystidia scanty and short.

Occasional throughout on living or dead oak trunks, causing serious decay.

#### 4. INONOTUS PERPLEXUS (Peck) Murrill

Pileus spongy-fleshy, fibrous, sessile, dimidiate to flabelliform, often narrowly attached, usually imbricate, somewhat laterally connate,  $4-6 \times 5-10 \times 0.5-1$  cm.; surface hairy-tomentose to setose-hispid, grayish-tawny to ferruginous, azonate, smooth, anoderm, becoming somewhat glabrous and subzonate with age; margin acute, sterile, pallid, entire; context tawny-ferruginous, subzonate, 2-3 mm. thick; tubes 3-5 mm. long, brownish-ferruginous within, mouths angular to irregular, 3-4 to a mm., edges acute, fimbriate to lacerate, hoary to dark-fulvous; spores broadly ellipsoid, smooth, deep-ferruginous,  $5-7 \times 4-5.5\ \mu$ .

Rather common throughout on dead or decaying trunks of beech, maple, and other deciduous trees. Near *P. cuticularis* of Europe.

#### 5. INONOTUS RADIATUS (Sow.) P. Karst.

Pileus corky to woody, imbricate, confluent, sessile, umbonate behind, especially when young,  $3-5 \times 6-9 \times 0.5-1$  cm.; surface radiate-rugose to very uneven, minutely velvety to glabrous, fulvous to ferruginous-fuscosus or almost black behind; margin thin, pallid, undulate to lobed; context subzonate, ferruginous to dark-fulvous, 1-3 mm. thick; tubes slender, grayish-umbrinous to fulvous, about 5 mm. long, mouths angular, somewhat irregular, 3-5 to a mm., edges whitish at first, becoming dark-fulvous with age, glistening, thin, fimbriate to lacerate; spores ellipsoid, luteolous,  $4-6 \times 3-4\ \mu$ .

Rather common throughout on decayed alder, birch, maple, and certain other deciduous trees. The usual form found on maple is quite different from the typical form on alder and birch and has been called *P. glomeratus* by Peck. The same two forms are said to occur in Europe.

#### 27. PHAEOLUS Pat.

Hymenophore large, irregular, annual, spongy to corky, epixylous; stipe simple, variously attached, wanting at times; surface of pileus anoderm, hispid; context ferruginous; tubes irregular, thin-walled; spores ellipsoid, smooth, hyaline; cystidia none.

### I. PHAEOLUS SISTOTREMOIDES (Alb. & Schw.) Murrill

Pileus spongy, circular, varying to dimidiate or irregular, 15-20 cm. broad, 0.5-2 cm. thick; surface setose-hispid to strigose-tomentose and scrupose in zones, ochraceous-ferruginous to fulvous-castaneous or darker, quite uneven, somewhat sulcate, obscurely zonate; margin yellow, rather thick, sterile; context very soft and spongy, fragile when dry, sometimes indurate with age, flavous-ferruginous to fulvous, 0.3-0.7 mm. thick; tubes short, 2-5 mm. long, flavous within, mouths large, irregular, averaging 1 mm. in diameter, edges thin, becoming lacerate, ochraceous-olivaceous to fuliginous, rose-tinted when young and fresh, quickly changing to dark-red when bruised; spores ellipsoid,  $7-8 \times 3-4 \mu$ ; stipe central to lateral or obsolete, very irregular, tubercular or very short, resembling the pileus in surface and substance.

Very common throughout on trunks, stumps, and roots of various coniferous trees, causing a very serious reddish-brown rot of the roots and lower part of the trunk.

### 28. COLTRICIELLA Murrill

Hymenophore small, annual, tough, epixylous; stipe attached to the vertex of the pileus; surface of the pileus anoderm, zonate; context spongy, fibrous, ferruginous; tubes angular, one-layered, dissepiments thin; spores ellipsoid, smooth, ferruginous.

#### I. COLTRICIELLA DEPENDENS (Berk. & Curt.) Murrill

Hymenophore gregarious or cespitose; pileus very small, conic, pendant, vertically attached, 1-2 cm. broad, about 1 cm. thick; surface cinnamon-colored, soft, elongate-striate, sericeous, subzonate; margin acute, fibrillose; context spongy, very thin, ferruginous-fulvous, 1-2 mm. thick; tubes long, 5-8 mm., fulvous, mouths large, angular, 1-2 to a mm., smaller near the margin, edges thin, toothed, yellowish to fulvous; spores ellipsoid, smooth, ferruginous,  $7-8 \times 3.5-4 \mu$ ; stipe central, attached at the vertex, cylindric, gradually enlarging as it approaches the pileus, about 1 cm. long, 1-3 mm. thick, resembling the pileus in surface and substance.

Occasional on decorticated pine wood in New Jersey.

### 29. COLTRICIA (Micheli) S. F. Gray

Hymenophore annual, terrestrial or humus-loving, simple, small to medium, usually circular and central-stemmed; surface

anoderm, brown, zonate or azonate; context yellowish or brown, coriaceous to spongy; hymenium concolorous, covered with yellowish or whitish powder when young; tubes thin-walled, at length fimbriate; spores smooth, rounded, yellowish-brown; cystidia rarely present.

Pileus concentrically zonate; context very thin.

Pileus shining-cinnamon, strigose, striate, thin, flexible, slightly depressed, the margin often fimbriate or pseudo-ciliate.

1. *C. cinnamomea*.

Pileus dull-rusty-cinnamon to hoary, velvety to glabrous, deeply depressed, the margin thicker and less fimbriate.

Tubes small, 0.5 mm. or less in diameter.

2. *C. perennis*.

Tubes large, 1 mm. in diameter.

3. *C. focicola*.

Pileus usually azonate; context rather thick and spongy.

Context duplex, soft above and woody below; hymenium beset with cystidia.

4. *C. tomentosa*.

Context homogeneous; hymenium free from cystidia.

5. *C. obesa*.

### I. COLTRICIA CINNAMOMEA (Jacq.) Murrill

Pileus coriaceous, thin, circular, umbilicate, sometimes deeply so, 1-4 cm. in diameter, 1-2 mm. thick; surface bright-cinnamon, cinereous, shining, strigose-striate, zonate; margin undulate to slightly lobed, fimbriate, concolorous; context membranous, concolorous, less than a mm. thick; tubes pale-umbrinous within, 1-2 mm. long, slightly decurrent, mouths rather large, angular, ferruginous to fulvous, 2-3 to a mm., edges thin, fimbriate-dentate, collapsing with age; spores ellipsoid, pale-yellowish-brown, smooth,  $6-8 \times 4-6 \mu$ ; stipe central, velvety, reddish-fusoid, nearly equal, 2-4 cm. long, 3-5 mm. thick.

Common throughout on mossy soil or wood almost reduced to humus.

### 2. COLTRICIA PERENNIS (L.) Murrill

Pileus coriaceous, circular, infundibuliform, 3-6 cm. broad, 1.5-3 mm. thick; surface zonate, short-tomentose, substriate, ferruginous to cinereous, the zones sometimes glabrous and chestnut-colored; margin very thin, entire to lacerate, inflexed when dry; context very thin, concolorous, scarcely a mm. thick; tubes short, grayish-umbrinous within, 1-3 mm. long, mouths small, angular, 2-4 to a mm., whitish when young, becoming fulvous, edges thin, dentate to lacerate, soon collapsing; spores ovoid, smooth, pale-yellowish-brown,  $4-6 \times 2-3.5 \mu$ ; stipe bulbous and often united with that of neighboring plants at the base, tapering upward, velvety, ferruginous to fulvous, solid, corky, 3-5 cm. long, 2-5 mm. thick.

Common throughout, especially northward, usually on exposed or burnt soil in woods.

3. *COLTRICIA FOCICOLA* (Berk. & Curt.) Murrill

Pileus membranous, circular, umbilicate, 3-6 cm. in diameter, 0.5-1 cm. thick; surface velvety, cinnamon to cinereous, multizonate; margin thin, entire or undulate; context very thin, ferruginous to fulvous, scarcely 1 mm. in thickness; tubes long, ample, ferruginous to fulvous within, 5-8 mm. long, mouths 1-2 mm. in diameter, angular, fulvous, edges thin, toothed, becoming lacerate and collapsed with age, causing the pores to appear much smaller than they really are; spores oblong-ellipsoid, smooth, pale-yellowish-brown, abundant, 1-guttulate,  $6 \times 3.5 \mu$ ; stipe central, cylindric, slightly enlarged at the base, velvety, ferruginous to fulvous, solid, corky, 2-3 cm. long, 3-5 mm. thick.

Frequent on burnt soil in woods from Connecticut southward.

4. *COLTRICIA TOMENTOSA* (Fries) Murrill

Pileus circular, varying to dimidiate, sometimes cespitose, 6-12 cm. in diameter, 3-5 mm. thick; surface ferruginous-fulvous, azonate, rarely subzonate, tomentose, plane or depressed at the center; margin lighter in color, sterile, acute, entire to lobed; context duplex, soft-corky, concolorous and spongy above, corky-woody, fibrous and flavous-ferruginous below, 2-4 mm. thick; tubes sometimes decurrent, about 1 mm. long, avellaneous within, mouths small, equal, angular, 3-5 to a mm., covered at first with a whitish substance, edges white, entire, becoming grayish-umbrinous, very thin and toothed with age; spores ellipsoid, smooth, pale-yellowish-brown,  $5-7 \times 2-4 \mu$ ; cystidia abundant, more or less curved, ovate-lanceolate at first, becoming more slender, fulvous-brown,  $50-75 \times 6-15 \mu$ ; stipe central to lateral or wanting, unequal, obese, fulvous, tomentose, resembling the context within, 0-5 cm. long, 5-15 mm. thick.

Common throughout under coniferous trees, usually attached to coniferous wood.

5. *COLTRICIA OBESA* (Ellis & Ev.) Murrill

Hymenophore simple or cespitose, sometimes connate; pileus circular, convex to depressed, 4-6 cm. broad, 5-10 mm. thick; surface fulvous, tomentose, azonate, smooth or pelliculose; margin yellowish-cinnamon, obtuse, becoming acute, entire or undulate; context homogeneous, soft, friable, fulvous, 4-8 mm.

thick; tubes short, about 1 mm. in length, pale-avellaneous within, mouths irregular, circular to radially-elongate and slightly sinuous, 0.5-1 mm. broad, edges becoming acute and slightly toothed, white to fulvous; spores ellipsoid, smooth, ferruginous,  $7-8 \times 4-5 \mu$ ; stipe central, spongy, tomentose, fulvous, 4-6 cm. long, 5-15 mm. thick above, enlarged below, 1-3 cm. in thickness.

Occasional on buried pine branches from Canada to North Carolina and west to Ohio. There is little to distinguish this species from *P. Montagnei* Fries.

### 30. CRYPTOPORUS (Peck) Hubbard

Hymenophore subglobose, sessile, epixylous; surface smooth, encrusted; context white, corky; tubes white, concealed at first by a volva, which is perforated at one or more points at maturity; mouths constricted, discolored; spores smooth, hyaline.

#### I. CRYPTOPORUS VOLVATUS (Peck) Hubbard

Pileus simple, sessile, rarely spuriously stipitate, globose to ungulate, 2-6 cm. broad, 1.5-3 cm. thick; surface white, sometimes slightly reddish-brown, smooth, slightly viscid or resinous when young, glabrous, marked with anastomosing depressed lines in larger specimens; margin very rounded, concolorous, smooth, produced into a volva covering the tubes, at length ruptured at 1-3 points forming small rounded or irregular apertures; context soft-corky, homogeneous, white, 2-5 mm. thick; tubes 1-1.5 mm. long, isabelline to umbrinous, mouths angular, yellow with a tinge of cinnamon, 3 to a mm., edges thick, becoming thin, entire; spores oblong, hyaline or pale-flesh-colored,  $11-13 \times 4-5 \mu$ .

Occasional throughout on dead coniferous wood. The species is largely dependent on insects for its distribution. The sporophores often emerge through insect tunnels, the volva is punctured by insects, and the spores are carried to other trunks by insects. See supplementary notes.

### 31. FOMES Gill.

Hymenophore sessile, ungulate or applanate, epixylous; surface anoderm or encrusted, sulcate, rarely zonate; context white, wood-colored, or flesh-colored, corky or woody, rarely punky; tubes cylindric, usually thick-walled, stratose; spores smooth, hyaline or subhyaline.

Context flesh-colored; light-brown in faded specimens.

Tubes 1-2 mm. long each season; spores ellipsoid.

Tubes 3-5 mm. long each season; spores globose.

Context white or nearly so.

Pileus less than 3 cm. broad.

Pileus unguate, becoming black only at the base, zonate and concentrically sulcate in age; tubes over 2 mm. long.

Pileus scutellate, uniformly black even when young; tubes less than 2 mm. long, context thinner than the tube-layer.

Pileus more than 3 cm. broad.

Pileus encrusted, surface darker than the context.

Pileus thin, distinctly zonate, irregular or applanate; crust brown to black.

Pileus thick, sulcate, unguate, rarely applanate.

Surface soon becoming rimose, deeply sulcate; older pores visible in the upper projecting annual layers; pileus exactly unguate; found only on *Shepherdia*.

Surface not as above.

Mouths of tubes 4-5 to a mm.; surface often resinous, bay or black in color; abundant on conifers.

Mouths of tubes 2-3 to a mm.; surface gray to black, never resinous nor reddish; found only on ash and a few other deciduous trees.

Pileus rarely encrusted, surface concolorous with the context.

Pileus chalk-white or slightly yellowish throughout, cylindric; context friable, bitter; growing on conifers.

Pileus not as above; growing on deciduous trees.

1. *F. roseus*.

2. *F. frazineus*.

3. *F. ohiensis*.

4. *F. scutellatus*.

5. *F. annosus*.

6. *F. Ellisianus*.

7. *F. unguatus*.

8. *F. fraxinophilus*.

9. *F. Laricis*.

10. *F. populinus*.

# I. FOMES ROSEUS (Alb. & Schw.) Cooke

Pileus woody, dimidiate, varying from conchate to unguate, often imbricate and longitudinally effused, 2-4 × 6-8 × 0.5-3 cm.; surface rugose, subfasciate, slightly sulcate, rosy or flesh-colored, becoming gray or black with age; margin acute, becoming obtuse, sterile, pallid, often undulate; context floccose-fibrose to corky, rose-colored, 0.2-2 cm. thick; tubes indistinctly stratose, 1-2 mm. long each season, mouths circular, 3-4 to a mm., edges obtuse, concolorous; spores ellipsoid, smooth, thick-walled, subhyaline, 3.5 × 6 μ.

Common throughout on living or dead trunks of conifers, and occasionally on deciduous trees, causing a serious rot. The

variation in the form of the sporophore from conchate to unguulate is sometimes very puzzling.

## 2. FOMES FRAXINEUS (Bull.) Cooke

Pileus corky to woody, dimidiate, applanate, usually imbricate, often laterally confluent, thinner in American forms, 4-10  $\times$  6-15  $\times$  1-6 cm.; surface velvety to glabrous, zonate at times, concentrically sulcate with age, at first white owing to a covering of fine waxy hairs, becoming bay and finally nearly black with age; margin thin or tumid, sterile, cream-colored, pulverulent with reddish blotches, becoming dark and hygrophanous when bruised; context punky, becoming corky, isabelline, tinged with carneous when fresh, 0.5-5 cm. thick; tubes indistinctly stratified, 0.5-1 cm. long each season, isabelline when old, reddish-flesh-colored in the younger layers, mouths subcircular, 4 to a mm., edges obtuse, entire, light-flesh-colored, covered at first with a white waxy coat, quickly changing to a darker color when bruised; spores subglobose, smooth, subhyaline, 6-7  $\times$  5-6  $\mu$ .

Frequent on trunks and stumps of certain deciduous trees in New York, Illinois, Ohio, and Michigan.

## 3. FOMES OHIENSIS (Berk.) Murrill

Pileus woody, unguulate, narrow and sometimes decurrent behind, often laterally connate, 0.5-1.5  $\times$  1-2  $\times$  0.3-1 cm.; surface minutely velvety to glabrous, zonate, light-brown, becoming black at the base, and concentrically sulcate with age; margin obtuse, pallid, often undulate; context corky, pallid, indistinctly zonate, 2-5 mm. thick; tubes distinctly stratified, 3-6 mm. long each season, nearly white within, mouths circular, 3 to a mm., edges obtuse, chalky-white, becoming cremeous; spores globose, smooth, hyaline, 5  $\mu$ ; conidia ovoid, smooth, hyaline, 12-13  $\times$  7-8  $\mu$ .

Frequent throughout on structural timbers and dead branches of deciduous trees.

## 4. FOMES SCUTELLATUS (Schw.) Cooke

Pileus woody, dimidiate or scutellate, concave below, 0.5-0.7  $\times$  1-1.5  $\times$  0.3-0.5 cm.; surface rugose, tuberculose, zonate, fuscous-black; margin acute, deflexed, pallid to light-brown; context woody, indistinctly zonate, isabelline, 2-3 mm. thick; tubes indistinctly stratified, 1-1.5 mm. long each season, isabelline within, mouths subcircular to rhomboid, 4 to a mm., edges rather thin, obtuse, entire, chalk-white, becoming avel-laneous.

Frequent in the eastern United States westward to Iowa on dead branches and timbers of alder, witch hazel, and other deciduous trees and shrubs.

5. *FOMES ANNOSUS* (Fries) Cooke

Pileus woody, dimidiate, very irregular, conchate to appanate, 10-13 × 5-8 × 0.5-2 cm.; surface at first velvety, rugose, anoderm, light-brown, becoming thinly encrusted, zonate, and finally black with age; margin pallid, acute, becoming thicker; context soft-corky to woody, white, 0.3-0.5 cm. thick; tubes unevenly stratified, 2-8 mm. long each season, white, mouths subcircular to irregular, 3-4 to a mm., edges rather thin, entire, firm, white, unchanging; spores subglobose or ellipsoid, smooth, hyaline, 5-6 × 4-5  $\mu$ .

Common throughout on trunks and roots of various coniferous trees, and rarely on deciduous trees, causing serious decay.

6. *FOMES ELLISIANUS* F. W. Anderson

Pileus dimidiate, unguulate, woody, 4-7 × 6-8 × 2-5 cm.; surface radiate-rugose, sulcate, light-bay or brown, becoming rimose and darker with age; margin obtuse or rounded, pallid, fertile; context corky, pale-ochraceous, 0.5-1 cm. thick, becoming scanty in the older sporophores; tubes indistinctly stratified, concolorous with the context, fragile, 0.5-1.5 cm. long each season, mouths subcircular, 3 to a mm., edges rather thick, pruinose when young, becoming concolorous; spores ovoid to slightly oblong, smooth, 5-6 × 4-5  $\mu$ .

Occasional on living trunks and branches of *Shepherdia argentea* in South Dakota, as well as in Montana, Colorado, and New Mexico. Very near *Fomes fraxinophilus*.

7. *FOMES UNGULATUS* (Schaeff.) Sacc.

Pileus corky to woody, unguulate, 8-15 × 12-40 × 6-10 cm.; surface glabrous, sulcate, reddish-brown to gray or black, often resinous; margin at first acute to tumid, pallid, becoming yellowish or reddish-chestnut; context woody, pallid, 0.5-1 cm. thick; tubes distinctly stratified, 3-5 mm. long each season, white to isabelline, mouths circular, 3-5 to a mm., edges obtuse, white to cream-colored; spores ovoid, smooth, 6  $\mu$ .

Extremely common throughout on living trunks of conifers and less frequent on deciduous trees growing near, causing a serious disease.

## 8. FOMES FRAXINOPHILUS (Peck) Sacc.

Pileus woody, subtriangular, compressed-ungulate, usually decurrent, 5-10 × 6-12 × 2-4 cm.; surface white, pulverulent or finely tomentose, concentrically sulcate, becoming gray or black and rimose with age; margin tumid, white or yellowish, velvety to the touch; context corky to woody, zonate, isabelline, 0.5-1 cm. thick; tubes evenly but indistinctly stratified, 2-4 mm. long each season, white when young, concolorous with the context in the older layers, mouths white, subcircular, 2 to a mm., edges obtuse; spores broadly ellipsoid, smooth, thin-walled, 7-8 × 6-7  $\mu$ .

Common throughout on living trunks of ash, rarely on other deciduous trees, causing a serious disease.

## 9. FOMES LARICIS (Jacq.) Murrill

Pileus firm, at length fragile, ungulate to cylindric, 3-8 × 5-10 × 4-20 cm.; surface anoderm, powdery, white or slightly yellowish, concentrically sulcate, becoming slightly encrusted, tuberculose and rimose; margin obtuse, concolorous; context soft, tough, at length friable, chalk-white or slightly yellowish, very bitter, with the odor of fresh meal, 1-3 cm. thick; tubes evenly stratified, concolorous, 5-10 mm. long each season, mouths circular to angular, 3-4 to a mm., edges thin, fragile, white, becoming discolored and lacerate, wearing away with age; spores ovoid, 4 × 5  $\mu$ .

Occasional on larch, pine, and spruce trunks in Michigan and westward. Long used in medicine in Europe, where it is much more common.

## 10. FOMES POPULINUS (Schum.) Cooke

Pileus corky to woody, effused-reflexed, rarely applanate, 2-4 × 5-10 × 1-3 cm.; surface anoderm, velvety, white or yellowish, usually overgrown with moss or otherwise disfigured with age; margin acute, slightly deflexed, concolorous, blackish where bruised, becoming thicker with age; context punky to corky, white to ochroleucous, 3-8 mm. thick; tubes very distinctly stratified, 1-2 mm. long each season, concolorous, with a resinous luster, mouths subcircular to angular, minute, 5-6 to a mm., edges thin, uneven, white to cremeous, glistening; spores globose, thin-walled, smooth, 3-4  $\mu$ .

Rather common throughout on living trunks of maple and certain other deciduous trees, causing decay.

## 32. PYROPOLYPORUS Murrill

Hymenophore large, perennial, epixylous, sessile, ungulate or applanate; surface sulcate, usually anoderm and often rough or rimose; context woody or punky, brown; tubes brown, cylindric, stratose, usually thick-walled; spores smooth, hyaline.

Pileus thick, ungulate; not found on *Prunus*.

Context fulvous, opaque.

Context melleous, lustrous.

Pileus thick, terraced, imbricate or semiresupinate; margin making an obtuse angle; found on *Prunus*.

Pileus thin, conchate, largely resupinate.

1. *P. igniarius*.

2. *P. Bakeri*.

3. *P. fulvus*.

4. *P. conchatus*.

## 1. PYROPOLYPORUS IGNIARIUS (L.) Murrill

Pileus woody, ungulate, sessile, 6-7 × 8-10 × 5-12 cm.; surface smooth, encrusted, opaque, velvety to glabrous, ferruginous to fuscous, becoming black and rimose with age; margin obtuse, sterile, ferruginous to hoary, tomentose; context woody, distinctly zonate, ferruginous to fulvous, 2-3 cm. thick; tubes evenly stratified, 2-4 mm. long each season, fulvous, whitish-stuffed in age, mouths circular, minute, 3-4 to a mm., edges obtuse, ferruginous to fulvous, hoary when young; spores globose, smooth, hyaline, 6-7  $\mu$ ; cystidia 10-25 × 5-6  $\mu$ .

Common throughout on living trunks of various deciduous trees, causing a very serious heart-rot. Formerly a source of tinder.

## 2. PYROPOLYPORUS BAKERI Murrill

Pileus compressed-ungulate to applanate, dimidiate, slightly decurrent, 4-10 × 8-20 × 3-5 cm.; surface smooth, anoderm, becoming glabrous, 2-3 times deeply sulcate, isabelline to gray or umbrinous; margin very broad and rounded, ferruginous, finely tomentose, perfectly smooth; context woody, dark-luteous, somewhat shining, 1.5-2 cm. thick; tubes distinctly stratified, 5-7 mm. long each season, avellaneous to fulvous within, mouths circular, 4 to a mm., edges obtuse, entire, light-yellowish to fuliginous; spores globose, smooth, hyaline, 5  $\mu$ .

Occasional on oak and black birch trunks in Wisconsin, Missouri, and westward.

## 3. PYROPOLYPORUS FULVUS (Scop.) Murrill

Pileus woody, triquetrous, rarely ungulate, thick and broadly attached behind, 1-3 × 5-7 × 3-8 cm.; surface smooth, very slightly sulcate, velvety, ferruginous, becoming horny and

glabrous and finally nearly black with age; margin subobtuse, ferruginous, velvety; context woody, fulvous, 1-2 cm. thick; tubes evenly stratified, 2-3 mm. long each season, fulvous, mouths circular, 3 to a mm., edges obtuse, entire, ferruginous to fulvous; spores globose, compressed on one side, hyaline,  $5.5-6 \times 4.5-5 \mu$ ; cystidia fulvous, ventricose,  $15-20 \times 7-9 \mu$ .

Frequent throughout on diseased trunks and stumps of various species of *Prunus*, causing decay.

#### 4. PYROPOLYPORUS CONCHATUS (Pers.) Murrill

Pileus conchate, broadly effused and often entirely resupinate,  $1-5 \times 7-10 \times 0.5-1.5$  cm.; surface rough, tomentose, irregularly sulcate, anoderm, brown to black, becoming thinly encrusted and slightly rimose with age; margin acute, undulate, ferruginous to fulvous, tomentose; context woody, thin, fulvous, 1-3 mm. thick; tubes indistinctly stratified, 1-2 mm. long each season, fulvous, mouths circular, 5-6 to a mm., edges obtuse, ferruginous to fulvous; spores globose, smooth, hyaline,  $4-5 \mu$ ; cystidia dark-brown, ventricose,  $15-30 \times 7-9 \mu$ .

Frequent throughout on decaying deciduous trunks.

### 33. FULVIFOMES Murrill, gen. nov.

Hymenophore large, perennial, epixylous, sessile, ungulate or applanate; surface sulcate, usually anoderm and often rough or rimose; context woody or punky, brown, rarely dark-red; tubes brown, cylindric, stratose, usually thick-walled; spores smooth, ferruginous or fulvous.

Type species, *Pyropolyporus Robiniae* Murrill.

Context fulvous.

Pileus thick, ungulate.

Tubes short, 1-5 mm. long each season; found only on *Robinia*.

1. *F. Robiniae*.

Tubes long, over 5 mm. each season; found usually on *Quercus*.

2. *F. Everhartii*.

Pileus thin, conchate to applanate; found usually on *Ribes*.

3. *F. Ribis*.

Context reddish-brown; found only on *Juniperus*.

4. *F. juniperinus*.

#### 1. FULVIFOMES ROBINIAE Murrill, comb. nov.

Pileus dimidiate, ungulate to applanate,  $5-25 \times 5-50 \times 2-12$  cm.; surface velvety, smooth, soon becoming very rimose and roughened, fulvous to purplish-black, at length dull-black, deeply and broadly concentrically sulcate; margin rounded, velvety, fulvous; context hard, woody, concentrically banded,

1-3 cm. thick, fulvous; tubes stratose, 0.15-0.5 cm. long, 5 to a mm., fulvous, mouths subcircular, edges entire, equaling the tubes in thickness; spores subglobose, smooth, thin-walled, ferruginous, 4-5  $\mu$ .

Common throughout the range of its host, *Robinia Pseudacacia*, causing a very serious rot of this tree. The sporophores were formerly used by colored people for keeping fire over night.

2. *FULVIFOMES EVERHARTII* (Ellis & Gall.) Murrill, comb. nov.

Pileus dimidiate, unguulate, broadly attached behind, 6-10  $\times$  6-15  $\times$  3-8 cm.; surface glabrous, slightly encrusted, deeply sulcate, not polished, gray to brownish-black, slightly rimose in age; margin obtuse, covered with ferruginous tomentum, becoming gray and glabrous; context corky to woody, repeatedly zoned, fulvous in dried specimens, 2-3 cm. thick; tubes evenly stratified, 0.5-1 cm. long each season, fulvous, mouths circular, 4 to a mm., edges rather thin, entire, ferruginous to fulvous, glistening, the hymenium becoming much cracked in age; spores globose, smooth, ferruginous, 3-4.5  $\mu$ ; cystidia abundant, pointed, larger at the base, 15-25  $\times$  6-10  $\mu$ .

Frequent throughout on living oak trunks and occasionally on beech, causing decay.

3. *FULVIFOMES RIBIS* (Schum.) Murrill, comb. nov.

Pileus tough, corky, becoming rigid, conchate, laterally connate, 3-5  $\times$  5-10  $\times$  0.7-1.5 cm.; surface rough, velvety, anoderm, indistinctly zoned, ferruginous to umbrinous, becoming glabrous and slightly encrusted with age; margin undulate to lobed, ferruginous, furrowed; context punky, fulvous, 3-5 mm. thick; tubes indistinctly stratified, 1-2 mm. long each season, fulvous, mouths circular, 5-6 to a mm., edges rather thin, entire, ferruginous to fulvous, hoary when young; spores globose or subglobose, pale-yellowish-brown, smooth, 3-4  $\times$  3  $\mu$ .

Occasional throughout on living stems of species of *Ribes*, and very rarely on other shrubs growing near the usual hosts.

4. *FULVIFOMES JUNIPERINUS* (Schrenk) Murrill, comb. nov.

Pileus unguulate, 3-5  $\times$  5-8  $\times$  5-7 cm.; surface tomentose, deeply sulcate, reddish-brown to dark-brown; margin obtuse, velvety, melleous or ferruginous to hoary; context woody, reddish-brown, 0.5-2 cm. thick; tubes indistinctly stratified, 0.5-1 cm. long each season, melleous within, reddish-brown in

the older layers, mouths circular, 2-3 to a mm., edges obtuse, entire, even, melleous; spores fulvous, smooth, globose or subglobose; cystidia few, subhyaline,  $100 \times 20 \mu$ .

Known only from a few sporophores collected on living trunks of *Juniperinus virginiana* in Tennessee, Kentucky, and Maryland. The rot is better known than the fruit-body.

### 34. PORODAEALEA Murrill

Hymenophore large, perennial, epixylous, sessile, conchate to ungulate; surface anoderm, sulcate, usually rough; context brown and woody; tubes concolorous, rarely in distinct layers, the hymenium varying from porose to daedaleoid; spores smooth, hyaline at maturity, becoming brownish with age; cystidia conspicuous.

#### I. PORODAEALEA PINI (Thore) Murrill

Pileus hard, typically ungulate, conchate or effused-reflexed in varieties, often imbricate,  $5-8 \times 7-12 \times 5-8$  cm., smaller in varieties; surface very rough, deeply sulcate, tomentose, tawny-brown, becoming rimose and almost black with age; margin rounded or acute, tomentose, ferruginous to tawny-cinnamon, entire, sterile in large specimens; context soft-corky to indurate, ferruginous, 5-10 mm. thick, thinner in small specimens; tubes stratified, white to avellaneous within, becoming ferruginous at maturity and in the older layers, 5 mm. long each season, much shorter in thin specimens, mouths irregular, circular or daedaleoid, often radially elongate, averaging 1 to a mm., edges ferruginous to grayish-umbrinous, glistening when young, rather thin, entire; spores subglobose, smooth, hyaline at maturity, becoming brownish with age,  $5-6 \times 3-4 \mu$ ; cystidia abundant, short,  $25-35 \times 4-6 \mu$ .

Very common throughout on living trunks of conifers, causing a very serious heart-rot. The variation in the shape of the sporophores is exceedingly confusing.

### 35. GLOBIFOMES Murrill

Hymenophore large, encrusted, perennial, epixylous, compound; context ferruginous, punky; tubes cylindric, thick-walled, stratose; spores ovoid, smooth, ferruginous.

#### I. GLOBIFOMES GRAVEOLENS (Schw.) Murrill

Hymenophore polyccephalous, globose, having the appearance of being thatched, 8-15 cm. in diameter, the center homogeneous,

ferruginous, floccose and rigid; pilei very numerous, cespitose-branched, closely imbricate, occupying the periphery of the mass; pileus corky, rigid, conchate, usually plicate,  $1-3 \times 0.5-0.8$  cm.; surface radiately sulcate, slightly zonate, purplish-fuscous, pulverulent to glabrous, slightly resinous in appearance, encrusted, grayish-black with age; margin fulvous, pulverulent, undulate or lobed, subacute, deflexed, sterile on the perpendicular portion, which is from 2 to 3 mm. long; context floccose, ferruginous, 2-5 mm. thick; tubes 2 mm. long, grayish-umbrinous, mouths circular, whitish-pulverulent to castaneous, fuliginous with age, edges thick, entire; spores globose or ovoid, smooth, ferruginous,  $4 \mu$ ; cystidia ovoid, hyaline, rather abundant,  $7 \times 4 \mu$ .

Occasional on dead trunks of oak, maple, and beech from Pennsylvania to Iowa and southward. Sometimes known as "sweet-knot," but the odor has also been described as disagreeable or entirely wanting. *Polyporus botryoides* Lév. is probably not distinct.

### 36. ELFVINGIELLA Murrill, gen. nov.

Hymenophore large, epixylous, sessile, appanate or ungulate; surface sulcate, horny-encrusted; context brown, punky; tubes brown, cylindric, stratose, thick-walled; spores smooth, hyaline or subhyaline.

Type species, *Elfvingia fomentaria* (L.) Murrill.

#### 1. ELFVINGIELLA FOMENTARIA (L.) Murrill, comb. nov.

Pileus hard, ungulate, concave below,  $7-9 \times 8-10 \times 3-10$  cm.; surface finely tomentose to glabrous, isabelline to avellaneous and finally black and shining with age, zonate, sulcate, horny-encrusted; margin obtuse, velvety, isabelline to fulvous; context punky, ferruginous to fulvous, conidia-bearing, 3-5 mm. thick; tubes indistinctly stratified, not separated by layers of context, 3-5 mm. long each season, avellaneous to umbrinous within, mouths circular, whitish-stuffed when young, 3-4 to a mm., edges obtuse, entire, grayish-white to avellaneous, turning dark when bruised; spores globose, smooth, hyaline or nearly so,  $3-4 \mu$ .

Common throughout on trunks of birch and beech, and occasionally on maple and a few other deciduous trees, causing serious decay. The punky substance of the sporophore was formerly used in tinder-boxes, and is still used as an absorbent in surgery and for the manufacture of various ornamental and useful articles.

## 37. ELFVINGIA P. Karst.

Hymenophore large, epixylous, sessile, applanate or ungulate; surface sulcate, horny-encrusted; context brown, punky; tubes brown, cylindric, stratose, thick-walled, mouths whitish or yellowish when young; spores brown; conidia present in most species on or near the surface of the pileus.

Hymenophore annual, persisting above later growths; pileus reniform, margin thin; spores roughly echinulate.

1. *E. lobata*.

Hymenophore truly perennial; tubes stratified; spores smooth or nearly so.

2. *E. megaloma*.

## 1. ELFVINGIA LOBATA (Schw.) Murrill

Pileus applanate, reniform to dimidiate, 5-8 × 10-15 × 1-2.5 cm.; surface concentrically sulcate, subzonate, glabrous, ferruginous to fulvous, becoming grayish-brown with age; margin thin, rarely rounded, creamy-white, smooth, entire; context punky with some horny fibers, chestnut-colored, slightly zonate, 5-8 mm. thick; tubes annual, 5-8 mm. long each season, avellaneous within, mouths circular, 4-5 to a mm., edges obtuse, entire, cremeous to umbrinous, becoming brownish when bruised; spores ovoid, dark-brown, asperulate, 8-10 × 6-7  $\mu$ .

Frequent from New York to Iowa and southward on certain deciduous trees, especially oak, causing decay of the trunk. The sporophores are peculiar in being annual.

## 2. ELFVINGIA MEGALOMA (Lév.) Murrill

Pileus hard, dimidiate, applanate, 6-15 × 8-30 × 1-4 cm.; surface milk-white to gray or umbrinous, glabrous, concentrically sulcate, encrusted, fasciate with obscure lines, conidia-bearing, usually brownish during the growing season from the covering of conidia; margin obtuse, broadly sterile, white or slightly cremeous, entire to undulate; context corky, usually rather hard, zonate, fulvous to bay, 5-10 mm. thick, thinner with age; tubes very evenly stratified, separated by thin layers of context, 5-10 mm. long each season, avellaneous to umbrinous within, mouths circular, 5 to a mm., whitish-stuffed when young, edges obtuse, entire, white or slightly yellowish to umbrinous, quickly changing color when bruised; spores ovoid, smooth or very slightly roughened, pale-yellowish-brown, truncate at the base, 7-8 × 5-6  $\mu$ .

Extremely common throughout on dead or diseased trunks of most deciduous trees, and also on conifers in certain sections, causing decay of the sapwood and exposed heartwood. It is

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known to cause root-rot in aspen and is doubtless destructive to the roots of other trees. The immense sporophores are often used by amateur artists for etching. The presence of conidia has recently been questioned.

### 38. GANODERMA P. Karst.

Hymenophore large, sessile or stipitate, perennial or annual, epixylous; surface sulcate, covered with reddish-brown varnish; context punky, brown or pallid; tubes cylindric, concolorous; spores ovoid, brown.

Sporophore annual.

Species confined to *Tsuga*.

1. *G. Tsugae*.

Species not found on *Tsuga*; usually on deciduous wood.

2. *G. sessile*.

Sporophore perennial, very truncate on the margin when mature.

3. *G. Curtisii*.

### 1. GANODERMA TSUGAE Murrill

Pileus corky to woody, fan-shaped, convex above, concave below, 4-20 × 5-25 × 1-4 cm.; surface glabrous, uneven, concentrically sulcate, laccate, lustrous, yellowish-red to mahogany-colored, at length black; margin light-yellow, acute, becoming concolorous, truncate, and marked with many shallow furrows, often undulate and at times more or less lobed; context soft-corky, radiate-fibrous, white or nearly so, 1-3 cm. thick; tubes annual, 0.5-0.75 cm. long, 4-6 to a mm., brown within, mouths circular or polygonal, white to light-cinnamon, edges obtuse, becoming acute; spores ovoid, obtuse at the base, attenuate and truncate at the apex, yellowish-brown, 9-11 × 6-8 μ; stipe lateral, ascending, frequently forked, cylindric, equal, 2-20 × 1-4 cm., resembling the pileus in color, surface, and context.

Common throughout on decaying trunks, stumps, and roots of *Tsuga canadensis*.

### 2. GANODERMA SESSILE Murrill

Pileus corky to woody, dimidiate, sessile or stipitate, imbricate or connate at times, conchate to fan-shaped, thickest behind, thin at the margin, 5-15 × 7-25 × 1-3 cm.; surface glabrous, laccate, shining, radiate-rugose, concentrically sulcate, yellow to reddish-chestnut, at length opaque-dark-brown, usually marked near the margin with alternating bay and tawny zones; margin usually very thin and acute, often curved downward and undulate, rarely becoming truncate, white, at length concolorous; context soft-corky or woody, radiate-fibrous, concentrically banded, ochraceous-fulvous; tubes 0.5-2 cm. long, 3-5 to a mm.,

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brown within, mouths circular or angular, white or grayish-brown, edges thin, entire; spores ovoid, obtuse at the base, attenuate and truncate at the apex, smooth, yellowish-brown,  $9-11 \times 6-8 \mu$ ; stipe laterally attached, usually ascending, irregularly cylindric,  $1-4 \times 0.5-1.5$  cm., resembling the pileus in color, surface, and substance, often obsolete.

Frequent on diseased trunks and dead stumps of both deciduous and coniferous trees from New England to Ohio and Missouri and southward. Very similar in its stipitate forms to *Polyporus lucidus* of Europe. *G. subperforatum* Atk., described from Ohio, is probably not distinct.

### 3. GANODERMA CURTISII (Berk.) Murrill

Pileus corky to woody, reniform, convex above, concave below,  $5-10 \times 8-15 \times 1-2$  cm.; surface glabrous, ochraceous to latericeous or bay, at first laccate, the varnish soon disappearing, broadly sulcate; margin obtuse to truncate, sulcate, ochraceous, entire, glabrous; context soft-corky, zonate, ochraceous above, fulvous below, 5 mm. thick; tubes perennial, indistinctly stratified, 5-8 mm. long each season, avellaneous-umbrinous within, mouths circular to slightly angular, 3-5 to a mm., edges entire, white or cremeous, becoming umbrinous; spores ovoid, attenuate and truncate at the apex, yellowish-brown,  $9-11 \times 5-8 \mu$ ; stipe usually eccentric or lateral, erect or ascending, equal or slightly enlarged above, cylindric, bay, laccate, the substance similar to the context and darker at the center,  $5-10 \times 2-3$  cm.

Frequent from New York to Michigan and southward on or about decayed trunks and stumps of oaks and other deciduous trees.

### 39. CERRENA (Micheli) S. F. Gray

Hymenophore small, epixylous, sessile, conchate, annual; surface anoderm, hairy or subglabrous, zonate or sulcate; context thin, white, fibrous, flexible; hymenium at first labyrinthiform, soon becoming irpiciform from the splitting of the dissepiments; spores smooth, hyaline.

### I. CERRENA UNICOLOR (Bull.) Murrill

Pileus coriaceous, sessile, imbricate, dimidiate to flabelliform, conchate, often laterally confluent,  $2.5-3.5 \times 5-10 \times 0.1-0.3$  cm.; surface villose-strigose, rugose, zonate, plicate, isabelline to fulvous, becoming avellaneous with age and blackish and

nearly glabrous behind; margin acute, undulate to lobed, paler, zonate, strigose-tomentose; context very thin, membranous, white, homogeneous, scarcely 1 mm. thick; tubes decurrent, labyrinthiform, 1-3 mm. long, white or isabelline to fuliginous or umbrinous, averaging 2 to a mm., edges acute, uneven, soon becoming dentate-lacerate, giving the hymenium an irpiciform appearance; spores ovoid, smooth, hyaline,  $4-6 \times 3-4 \mu$ .

Very common throughout on dead deciduous wood, and rarely on coniferous wood.

#### 40. DAEDALEA Pers.

Hymenophore epixylous, usually large and annual, sessile, appanate to unguulate; surface anoderm, glabrous, often zonate; context white or wood-colored, rigid, woody or punky; hymenium normally labyrinthiform, but varying to lamellate and porose in some species; spores smooth, hyaline.

Tubes one to several millimeters in transverse diameter; surface usually brown or discolored.

Pileus thick, triangular, margin obtuse.

Context isabelline; found on oak and chestnut.

Context white; found on red cedar and very rare.

Pileus thin, appanate, margin thin.

Tubes less than one half millimeter in transverse diameter; surface white or yellowish.

1. *D. quercina*.

2. *D. juniperina*.

3. *D. confragosa*.

4. *D. ambigua*.

##### 1. DAEDALEA QUERCINA (L.) Pers.

Pileus corky, rigid, dimidiate, sessile, imbricate, appanate, convex below, triangular in section,  $6-12 \times 9-20 \times 2-4$  cm.; surface isabelline-avellaneous to cinereous or smoky-black with age, slightly sulcate, zonate at times, tuberculose to colliculose in the older portions; margin usually thin, pallid, glabrous; context isabelline, soft-corky, homogeneous, 5-7 mm. thick; tubes labyrinthiform, becoming nearly lamellate with age in some specimens, 1-2 cm. long, 1-2 mm. broad, chalk-white or discolored within, edges obtuse, entire, ochraceous to avellaneous.

Very common throughout on stumps, trunks, and timbers of oak and chestnut.

##### 2. DAEDALEA JUNIPERINA Murrill

Sporophore corky, attached by a broad, often decurrent base and composed of imbricate, terraced or laterally connate, unguulate pilei  $2-5 \times 2-7 \times 1.5-3$  cm.; surface irregular, anoderm, finely tomentose, yellowish-white, becoming cinereous with age; marginal edge fertile, concolorous, not rounded, but often

forming an obtuse angle; context corky, white, concentrically banded, 0.5–1 cm. thick; furrows large, labyrinthiform, radially or rarely otherwise elongate, 0.5–2 cm. long, 1–3 mm. wide, white or pallid, edges obtuse, often splitting into broad irpiciform plates; spores smooth, hyaline, ovoid,  $5-6 \times 3-4 \mu$ .

Occasional on dead stumps and trunks of red cedar in Missouri, Kansas, and Kentucky,

### 3. DAEDALEA CONFRAGOSA (Bolt.) Pers.

Pileus corky to woody, imbricate, sessile, dimidiate, convex or plane above, variable in size,  $2-7 \times 3-10 \times 0.5-1.5$  cm.; surface multizonate, rugose, scrupose, often tuberculose, becoming glabrous, isabelline or avellaneous to latericeous-fuscos; margin thin, entire to lobed, pallid, fertile, dark-brown when bruised; context corky to woody, white to avellaneous, zonate, 3–10 mm. thick; tubes very variable, porose or labyrinthiform, often becoming lamellate with age, 0.5–1.5 mm. broad, 5–10 mm. deep, white or avellaneous within, mouths grayish-pruinose when young, becoming umbrinous or reddish-fuscos, edges thin, becoming lacerate-dentate and often fimbriate, turning at once to yellowish-brown when bruised; spores smooth, hyaline, cylindric to ellipsoid,  $5-8 \times 2-3 \mu$ .

Extremely common throughout on various forms of deciduous wood. This is one of the most variable species known.

### 4. DAEDALEA AMBIGUA Berk.

Pileus corky, reniform, sessile or spuriously stipitate, simple, applanate,  $8-12 \times 10-20 \times 0.5-1.5$  cm.; surface glabrous, smooth, azonate, polished, milk-white to yellowish, sometimes purplish-black with age; margin rather thin, white, entire or undulate; context floccose, zonate, white, 4–8 mm. thick; tubes varying from circular to labyrinthiform, minute, white, 3 to a mm. measured transversely, 4–6 mm. deep, edges thick, entire, white to isabelline; spores globose, smooth, hyaline,  $2-3 \mu$ .

Occasional on dead trunks of deciduous trees in Indiana, Ohio, Missouri, and southward; more frequent in the southern states.

### 41. LENZITES Fries

Hymenophore small, annual, epixylous, sessile, conchate; surface anoderm, usually zonate and tomentose; context white, coriaceous, flexible; hymenium lamellate, the radiating gill-like dissepiments connected transversely at times, especially in youth; spores smooth, hyaline.

## 1. LENZITES BETULINA (L.) Fries

Pileus thin, coriaceous, sessile, dimidiate to flabelliform, imbricate, conchate,  $3-4 \times 4-7 \times 0.3-1$  cm.; surface conspicuously tomentose, velvety, multizonate, somewhat uneven, often radiate-rugose to plicate, avellaneous with latericeous zones, becoming olivaceous with age; margin thin, undulate to lobed at times; context very thin, white, membranous, scarcely a mm. thick; furrows slightly anastomosing when very young, 1-2 mm. broad, 3-10 mm. deep, edges thin, entire to undulate, slightly notched with age, cremeous within, ochroleucous to sordid-ochraceous without; spores globose, smooth, hyaline,  $6 \mu$ .

Extremely common throughout on various forms of dead deciduous wood and rarely on coniferous wood.

## 42. GLOEOPHYLLUM P. Karst.

Hymenophore small, annual, epixylous, sessile; surface hairy or glabrous, anoderm, often zonate; context tough, brown; hymenium normally lamelloid or daedaleoid, but frequently poroid in some species; spores smooth, hyaline.

Context avellaneous to umbrinous, furrows about 0.5 mm. broad. 1. *G. trabeum*.

Context ferruginous to castaneous, furrows about 1 mm. broad. 2. *G. hirsutum*.

## 1. GLOEOPHYLLUM TRABEUM (Pers.) Murrill

Pileus corky, rather soft, dimidiate, sessile, laterally connate, plane or convex above, nearly plane below,  $2 \times 4-8 \times 0.5-1$  cm.; surface anoderm, tomentose, smooth or slightly tubercular, usually azonate, opaque, isabelline when fresh, becoming avellaneous to umbrinous and finally fuliginous behind, changing immediately to ferruginous or fulvous when bruised; margin very thin, nearly entire, ochroleucous; context soft, punky, homogeneous, dull-umbrinous, 1-3 mm. thick; tubes annual, 2-4 mm. long, ochroleucous to isabelline within, mouths irregular, daedaleoid or radially elongate, averaging 0.5 mm. in width, edges uneven, isabelline to grayish-umbrinous or fulvous, the transverse walls often splitting with age and giving the hymenium a lamelloid appearance; spores cylindric, smooth, hyaline,  $9-12 \times 3-4 \mu$ .

Common throughout on dead deciduous and coniferous wood, structural timbers in particular.

## 2. GLOEOPHYLLUM HIRSUTUM (Schaeff.) Murrill

Pileus hard, corky to woody, slightly flexible, imbricate, sessile, laterally connate, often decurrent, oblong-dimidiate to flabelli-

form, conchate,  $2-3 \times 4-8 \times 0.3-1$  cm.; surface zonate, strigose-tomentose, anoderm, rather uneven, reddish-fulvous to fuliginous or umbrinous; margin rather thick, sterile, isabelline, undulate, finely tomentose, becoming acute and darker in age; context soft-corky, homogeneous, fulvous, about 2 mm. thick; tubes usually lamelloid, anastomosing when young, ochraceous to grayish-umbrinous, 0.5-1 mm. broad, 2-5 mm. deep, edges thin, undulate; in a poroid variety, tubes circular, regular, 2 to a mm., edges thick, firm, entire; spores ellipsoid, smooth, hyaline,  $8-12 \times 3-4 \mu$ .

Extremely common throughout on dead coniferous wood, and rarely on deciduous wood. It is very destructive to coniferous timber, and sometimes causes heart-rot in living trunks.

#### 43. CYCLOPORUS Murrill

Hymenophore annual, tough, anoderm, terrestrial, centrally stipitate; context soft, spongy, ferruginous; pores at first polygonal, soon becoming continuous concentric furrows, dissepiments thin, lamelloid; spores ovoid, smooth, ferruginous.

##### 1. CYCLOPORUS GREENEI (Berk.) Murrill

Pileus circular, obconic to explanate, rarely cespitose, 5-10 cm. broad, 5-10 mm. thick at the center, much thinner at the margin; surface undulate, zonate, tomentose to glabrous and shining, ferruginous to fulvous, fuliginous-black in some old plants; margin at first rounded, sterile, undulate, isabelline, becoming very thin, darker, and somewhat eroded with age; context spongy, fragile, zonate, ferruginous to fulvous, scarcely 1 mm. thick in mature plants; tubes oblong-polygonal when very young, soon becoming concentric furrows, 5-8 mm. deep, 1-2 mm. wide, undulate, pale-fulvous to fuliginous, edges isabelline to umbrinous, very thin, uneven, splitting with age; spores ovoid, smooth, pale-ferruginous,  $5-6 \times 10-12 \mu$ ; stipe central, enlarged above, irregular, tomentose, fulvous to fuliginous, spongy and brown within, 3-8 cm. long, 1.5-2 cm. thick.

Occasional on the ground in woods from New England to Iowa and southward.

## SUPPLEMENTARY NOTES

*Tyromyces (Polyporus) caesiosimulans* Atk. Jour. Myc. 6: 61. 1908. Said to be near *T. caesi* (Schr.) Murrill, but to have globose, pedicellate spores.

*Polyporus confuens* (Alb. & Schw.) Fries. Reported more than once from America.

*Microporellus dealbatus* (Berk. & Curt.) Murrill. Occasional southward in the Mississippi valley.

*Polyporus epileucus* Fries. Reported from South Carolina by Curtis and said by others to occur northward.

*Tyromyces (Polyporus) fumidiceps* Atk. Ann. Myc. 6: 61. 1908. Said to be near *T. chioneus* (Fries) Karst., but to have a darker pileus and very different spores.

*Trameles merisma* Peck, Bull N. Y. State Mus. 139: 31. 1910. Pendant from the lower surface of dead prostrate beech trunks.

*Polyporus osseus* Kalchb. Occasional northward.

*Polyporus pennsylvanicus* Sumstine, Jour. Myc. 13: 137. 1907. Recently reported also from Ohio and said to be near *P. caudicinus* (Scop.) Murrill, but worthy of distinct rank.

*Scutigera retipes* (Underw.) Murrill. Reported from New Jersey.

*Coriolus sericeohirsutus* (Kl.) Murrill. Occasional southward.

*Polyporus spumeus* (Sow.) Fries. Recently reported from Ohio as being very near *Spongipellis delectans* (Peck) Murrill, but having smaller tubes and more globose spores. Some consider it the same as *S. galactinus*.

*Tyromyces (Polyporus) subpendulus* Atk. Jour. Myc. 6: 61. 1908. Similar to *Porodisculus pendulus* in form but very different in structure and occurring on *Tsuga*.

*Cryptoporus volvatus* (Peck) Hubbard. This species is so distinct as to constitute a new tribe, the Volvatae, characterized by the presence of a volva. The sporophore is annual and matures early in the season, so that the volva would probably rupture by decay in time to distribute the spores even if no apertures were present.

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